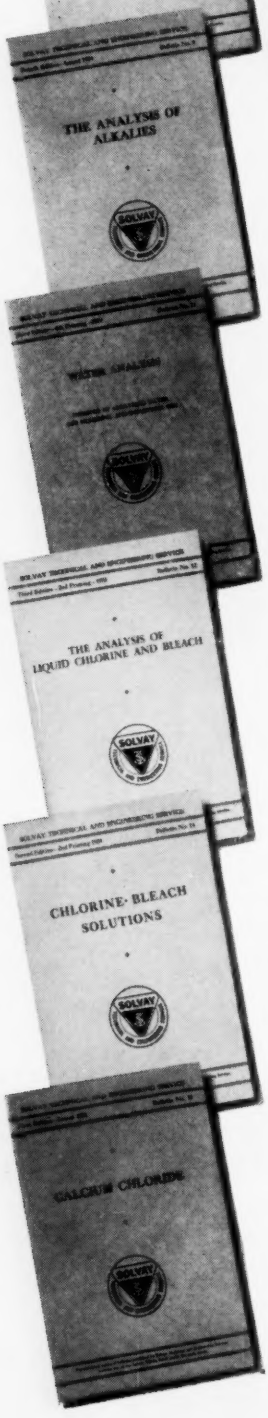
Chemical Week

October 5, 1957

Price 35 cents

A McGRAW-HILL PUBLICATION



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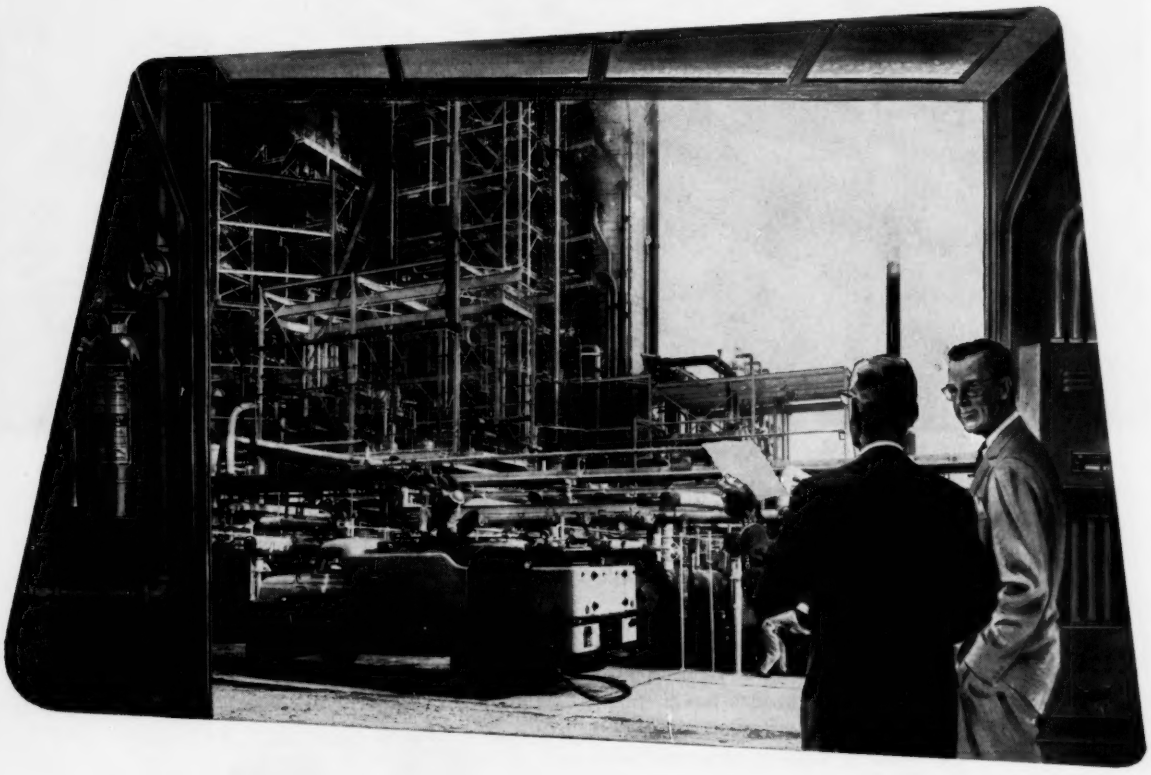
AN-10

Dowell Service Helped This Plant Profit By Saving $312,700 in Maintenance Costs!



To clean and service the giant catalytic crackers in today's modern refineries is quite a job . . . and very costly. Costly, that is, unless Dowell Service is on the job to help clean the "cats"—chemically. Here's an example of how Dowell chemical cleaning service cut turnaround costs for one refiner by $312,700.

Dowell was called in to provide cat cracker turnaround service which included the cleaning of: two flue gas coolers, two catalyst coolers, four overhead aftercoolers, one light gas oil cooler, one heavy gas oil cooler, two top tray reflux coolers, and two final gas condensers.

Dowell's time: thirteen and one-half hours; Cost: $2300.

It is estimated that this same cat cracker service, if done by mechanical methods, would have cost the refinery: 1) Additional downtime of seven days—$210,000; 2) Additional spare bundle inventory—$100,000; 3) Labor—$5,000.

The refinery enjoyed a $312,700 operating credit from this single cat cracker turnaround—not including expected efficiency increases.

Dowell provides expert service in removing scale and sludge from product, process and steam generating systems. Dowell does the job for you—furnishing all chemical solvents, trained personnel, pumping and control equipment. Furthermore, Dowell has the experience in chemical cleaning to provide assurance of a job well done.

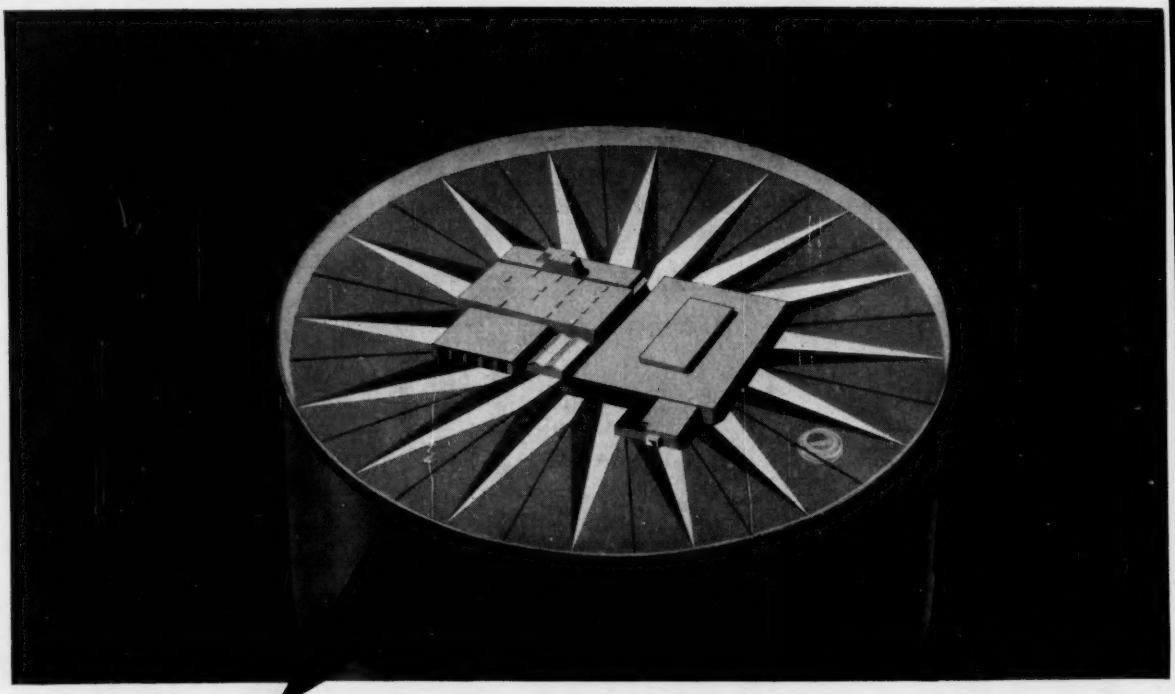
While the example here deals with an oil refinery, Dowell chemical cleaning has recorded similar profit-making savings for other industries. Dowell engineers can show you performance data in almost any field — steel, chemical, power, paper, construction.

For specific information on how Dowell chemical cleaning can help your plant to greater profits, call the Dowell office nearest you. Or write Dowell Incorporated, Tulsa 1, Oklahoma.

have Dowell clean it chemically

DOWELL

A SUBSIDIARY OF THE DOW CHEMICAL COMPANY



In the South, move your chemicals in safe SSIRCO steel drums

SSIRCO steel containers, manufactured in the heart of the South's steel district in Birmingham, are offered with all types of linings for chemical products. Diamond Black Leaf Company uses SSIRCO drums to carry a variety of emulsifiable insecticides. The Quaker Oats Company ships furfuryl alcohol in their containers. West Disinfecting Company uses these drums to ship a wide variety of industrial plant compounds and other chemical products.

Prominent companies in the process industries have proved the quality of SSIRCO metal containers through storage and shipping. Special liners have been used to meet the requirements of many companies in keeping their products away from the interior metal. Many companies are using drums decorated by SSIRCO, with identifications silkscreened or stenciled to specifications.

When you are ready to move food, chemical or petroleum products in the South, call SSIRCO. Many forward-looking firms are relying on SSIRCO service for prompt, accurate drum deliveries. If you would like more details now, we shall be glad to supply them.

METAL CONTAINER DIVISION
SOUTHERN STATES IRON ROOFING COMPANY
SINCE 1914
2830 Fifth Avenue, North — Birmingham, Alabama

Chemical Week

TOP OF THE WEEK

October 5, 1957

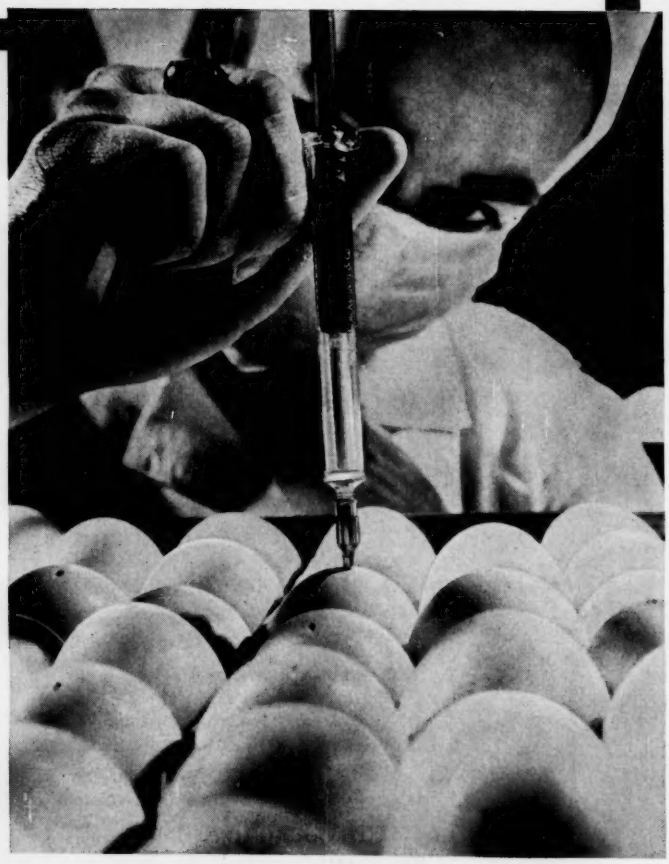
- **Quick work by chemical firms clears up cyanide hazard** and demonstrates industry public relations at best .....**p. 49**
- **Compactness and portability of indoor "solar" furnace** bring extremely high temperatures within reach of smallest laboratory .....**p. 59**
- **Sales outlook for chemicals is "good,"** say marketers at National Industrial Conference Board meeting .....**p. 68**
- **There's a lot of profit in a little-known business.** Morticians use a wide variety of chemical specialties .....**p. 85**

Vol. 81
No. 14

Chemical Week (including Chemical Specialties and Chemical Industries) is published weekly by McGraw-Hill Publishing Co., Inc., 330 W. 42nd St., New York 36, N. Y. Printed in U.S.A. Second-class mail privileges authorized at Philadelphia, Pa. Subscription: $3/year in U.S.A., U.S. Possessions; $4, Canada; $15, other Western Hemisphere countries; $25, all other countries. Also see p. 15.

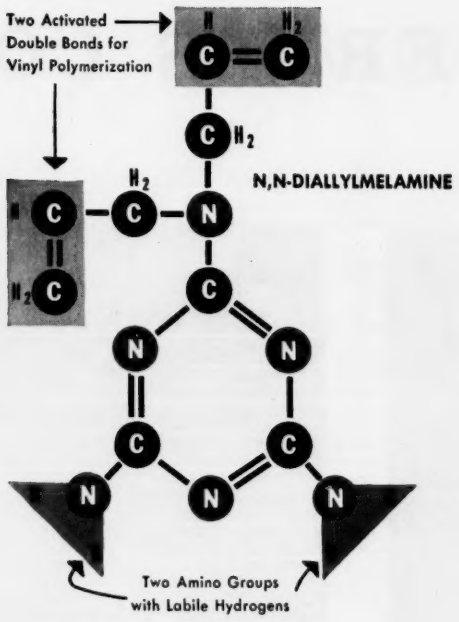
Watch CW Grow — 37,784 copies of this issue printed

Life on the Chemical Newsfront

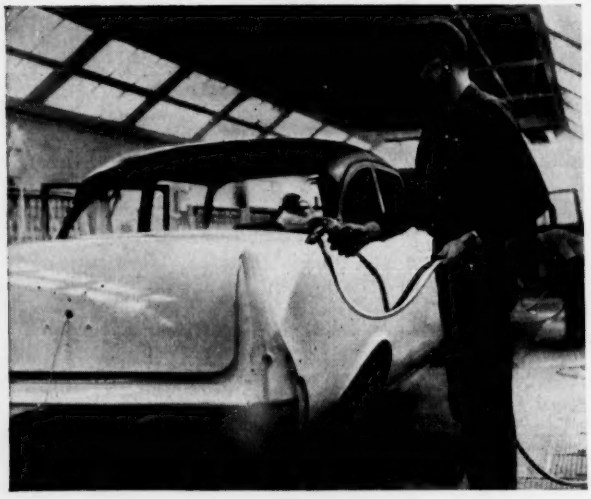


THE THREAT OF ASIATIC FLU VIRUS spurred a "crash" program at Lederle Laboratories in which the entire virus section was turned to producing preventive vaccine. First step is the inoculation of chick embryo with the virus strain. The harvested virus is subsequently concentrated and purified, then inactivated by formalin so that it is safe for human use and will still protect against influenza. Cyanamid's virus research center is one of the world's largest and most fully equipped, and conducts a continuing program to combat these ultramicroscopic killers. **(Lederle Laboratories Division)**

A MODERN QUALITY is given to cotton fabrics by CYANALUBE* TSI Softener. A non-ionic emulsion of polyethylene, CYANALUBE TSI Softener is added to the resin baths used in finishing processes. The tear resistance and workability of the treated cottons are improved, leading to wider use of CYANALUBE TSI "lubricated" fabrics in wearing apparel. CYANALUBE TSI is a translucent emulsion, readily dilutable in cold water and is compatible with most textile finishing agents normally employed. **(Organic Chemicals Division)**



A POLYFUNCTIONAL TRIAZINE combines the possibilities of vinyl polymerization and linear condensation. It's N,N-diallylmelamine which, for example, forms curable resins with vinyl monomers and polymerizes with Acrylonitrile to form synthetic fibers receptive to acid dyes. A dimethylol derivative is easily obtained and this converts to a hard resin suitable for thermosetting polymerization. Technical data on N,N-diallylmelamine is available from the New Product Development Department. **(Dept. D)**



NEW HIGHWAYS "MAKE THE GRADE" more easily with Cyanamid explosives economically reducing obstructing rock formations to rubble. As tens of thousands of miles of first-class roads are built in the next few years, there will be greater dependence than ever on explosives in the construction of straight, level highways meeting today's motoring requirements. Cyanamid is increasing the capacity of its New Castle, Pa. plant to meet the growing demand for modern explosives for road construction. **(Organic Chemicals Division)**

LOWER-COST, BETTER-WORKING LACQUERS are being made with AERO* Ethyl Lactate. This synthetic ester-alcohol improves the compatibility between the relatively expensive lacquer solvents and low-cost diluents, permitting more economical formulations. In addition, the low evaporation rate of ethyl lactate reduces the danger of "blushing"—the staining caused by water condensation on the lacquer surface. AERO Ethyl Lactate is a high-quality product having physical properties that are reproducible from batch to batch.

(Industrial Chemicals Division, Dept. D)

*Trademark

CYANAMID

AMERICAN CYANAMID COMPANY
30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

Helping America Make Better Use of Its Resources

1907 CYANAMID 1957

For further information on these and other chemicals, call, write or wire American Cyanamid Company.

HEAVY MINERALS CO.

A Domestic Rare Earth Operation From Mine to Consumer

HEAVY MINERALS CO. is the only rare earth producer in the United States which owns and operates its own mines.

Rare earth source materials—monazite and xenotime—are mined by HEAVY MINERALS and processed at HMC's modern Chattanooga plant into mixed and individual rare earth chemicals and thorium.

HEAVY MINERALS now has available rare earth oxide and salts, cerium-free rare earth oxide and salts, and didymium (classical) oxide and salts, as well as the individual rare earth chemicals listed at right. Perhaps one of these materials will fit the application you have in mind.

Send for free informative booklet

HEAVY MINERALS CO.

RARE EARTH CHEMICALS • THORIUM • HEAVY MINERALS

4000 NORTH HAWTHORNE STREET, CHATTANOOGA, TENN.
NEW YORK SALES OFFICE: 261 MADISON AVENUE, N. Y. 16, N. Y.

PRODUCT	Formula	Atomic No.	
Scandium	Sc	21	
Scandium Oxide	Sc_2O_3		
Yttrium	Y	39	
Yttrium Oxide	Y_2O_3		
Lanthanum	La	57	
Lanthanum Oxide	La_2O_3		
Cerium	Ce	58	
Cerium Oxide	CeO_2		
Praseodymium	Pr	59	
Praseodymium Oxide	Pr_6O_{11}		
Neodymium	Nd	60	
Neodymium Oxide	Nd_2O_3		
Samarium	Sm	62	
Samarium Oxide	Sm_2O_3		
Europium	Eu	63	
Europium Oxide	Eu_2O_3		
Gadolinium	Gd	64	
Gadolinium Oxide	Gd_2O_3		
Terbium	Tb	65	
Terbium Oxide	Tb_4O_7		
Dysprosium	Dy	66	
Dysprosium Oxide	Dy_2O_3		
Holmium	Ho	67	
Holmium Oxide	Ho_2O_3		
Erbium	Er	68	
Erbium Oxide	Er_2O_3		
Thulium	Tm	69	
Thulium Oxide	Tm_2O_3		
Ytterbium	Yb	70	
Ytterbium Oxide	Yb_2O_3		
Lutetium	Lu	71	
Lutetium Oxide	Lu_2O_3		
Thorium	Th	90	
Thorium Oxide	ThO_2		

NOTES: (1) Index of Refraction — Cerium 2.33-2.35, Thorium 2.20 (lg), (2) Dielectric Constant — Cerium 7.0, Thorium 10.6, (3) Linear Elasticity Modulus — Lanthanum 3.820 Kg/mm²

4000 NORTH HAWTHORNE STREET • CHATTANOOGA, TENNESSEE

PROPERTIES OF RARE EARTHS AND THORIUM

Formula Wt.	Density	M.P. °C	B.P. °C	Oxide States	Ionic Radius	Normal Color	Δ H. VAP. (Kcal/mole)	Δ H. FUS. (Kcal/mole)	Crystal Stru.	Trans. Temp. °C	Brinnel Hardness	Compressibility ($Cm^2/Kg \times 10^6$)	Neutron Absorption Cross-Sect. (Barns)	Electric Resist. (Microhm—cm. 25°C)
45.10	3.016	1550-1600	2477	III			73	3.8	h. c. p.				22	
138.20	3.86				1.51	White								
88.92	4.472	1552	3027	III			80	4.1	h. c. p.			2.96	1.38	
225.84	4.8-5.0	2410			1.06	White			Cubic					
138.92	6.162	920	4242	III			81	2.4	Hex f. c. c.	300-350 868	37	4.06	8.9	56.8
325.8	6.51	2315			1.22	White			Hex					
140.13	6.768	804	2927	III, IV			79	2.2	f. c. c.	754	28	3.87	.70	75.3
172.1	7.3	2600			1.18	White			Cubic					
140.92	6.769	935	3017	III,(IV)			79	2.4	Hex	798	25	3.67	11.2	68.0
1021.5					1.16	Black			Cubic					
144.27	7.007	1024	3177	III			69	2.6	Hex	868		3.19	46	64.3
336.5	7.24				1.15	Lt. Blue			Hex					
150.35	7.540	1052	1627	(II), III			46	2.6	Rhom	917		3.71	5500	
348.7	7.43				1.13	Off-White			Cubic					
152.0	5.168	<900	1427	(II), III			40	2.5	b. c. c.				4600	
352.0	7.42				1.13	White			Cubic					
157.26	7.868	1350	2727	III			72	3.7	h. c. p.			2.58	46000	
362.5	7.407				1.11	Yellowish Brown			Cubic					
158.93	8.253	1360	2527	III,(IV)			70	3.9	h. c. p.	1310			44	
747.7					1.09	Dk. Brown			Cubic					
162.51	8.556	>1400	2327	III			67	4.1	h. c. p.			2.74	1100	
373.0	7.81				1.07	White			Cubic					
164.94	8.799	1500	2327	III			67	4.1	h. c. p.			2.66	64	
377.9					1.05	Lt. Yellow			Cubic					
167.27	9.058	1500-1550	2627	III			70	4.1	h. c. p.			2.63	166	
382.5	8.640				1.04	Rose-red			Cubic					
168.94	9.318	1550-1600	2127	III			56	4.4	h. c. p.			2.72	118	
385.9	8.6				1.04	Greenish White			Cubic					
173.04	6.959	824	1527	(II), III			40	2.2	f. c. c.					
394.1	9.2				1.00	White			Cubic	798		8.00	36	
174.99	9.849	1650-1750	1927	III			59	4.6	h. c. p.			2.32	108	
398.0					0.99	White			Cubic					
232.05	11.2	1845	4500	IV					f. c. c.	225	75-80 VPN		7	18.6(20°C)
264.12	10.03	3050	4400		1.80-1.82	White			Cubic					

REFERENCES: (1) C. J. Gorter, Progress in Low Temp. Physics, North Holland Pub. Co., Amsterdam, 2, 370-371 (1957), (2) Donald J. Hughes and John A. Harvey, Neutron Cross Sections, Brookhaven National Lab. (1955), (3) F. H. Spedding, A. H. Daane and K. W. Herrmann, J. Metals, 9, 895 (1957). For general bibliography see Reference No. 1.

OPINION

Company Cravats

To THE EDITOR: Your story on G. S. Harvale's specially designed company neckties (*CW, Sept. 14, p. 26*) came to my attention just 20 minutes after I read a poem by Sec in the Sept. 19 issue of *The Reporter*. Your readers might be interested in the psychological advantages Sec adds to the uses of the ties mentioned in your article.

Balls and Chains*

Feeling unwanted? Don't seem to belong?
Life has no meaning? Get lost in a crowd?
Salvation is here, man, there's no need to cry:
The world will be yours with a company tie.

Oh, if you're Socony you'll wear a red horse,
And nuts means you're in Southern Screw;
RCA boys have a small dog, of course;
Come closer, my friend; who are you?

No longer, no longer, that terrible ache,
That echoing moan, "Who am I?"
Now the heart's song is, "At last I belong—
You can tell by my company tie!"
—Sec

ELLIOT SCHRIER
Western Division
Arthur D. Little, Inc.
San Francisco, Calif.

Tank-Car Leases

To THE EDITOR: In your article "Chemicals: Top Customers for Leased Cars" (*Aug. 10, p. 88*), the statement is made that in 1956, the chemical industry spent a total of $38 million in car leasing, of which $27 million was spent for tank cars, and that the petroleum industry paid out $7 million for such leases.

If these figures are true, they could be used to good advantage; however, we question whether or not an error has been made in the petroleum industry figure, because practically all of the income of the Union Tank Car Co. comes from the petroleum industry, and a large portion of that of General American Transportation Corp. and a good portion of the income of Shippers' Car Line and North American Car Corp. come from petroleum cars.

It looks, then, as if the petroleum industry is leasing from 75,000 to 80,000 tank cars and the chemical industry 18,000 to 20,000 cars.

In view of the number of cars leased to the two industries, we question whether the $7 million you report is correct.

J. E. WEAVER
Assistant Traffic Manager
Columbia-Southern Chemical Corp.
Pittsburgh, Pa.

The article in question should have specified that the $7-million figure referred only to leasing charges for cars carrying petroleum materials classified under S.I.C. code 2911 (petroleum refining) and 2999 (petroleum products, n.e.c.), and not to all petroleum shipments.—ED.

Not Involved

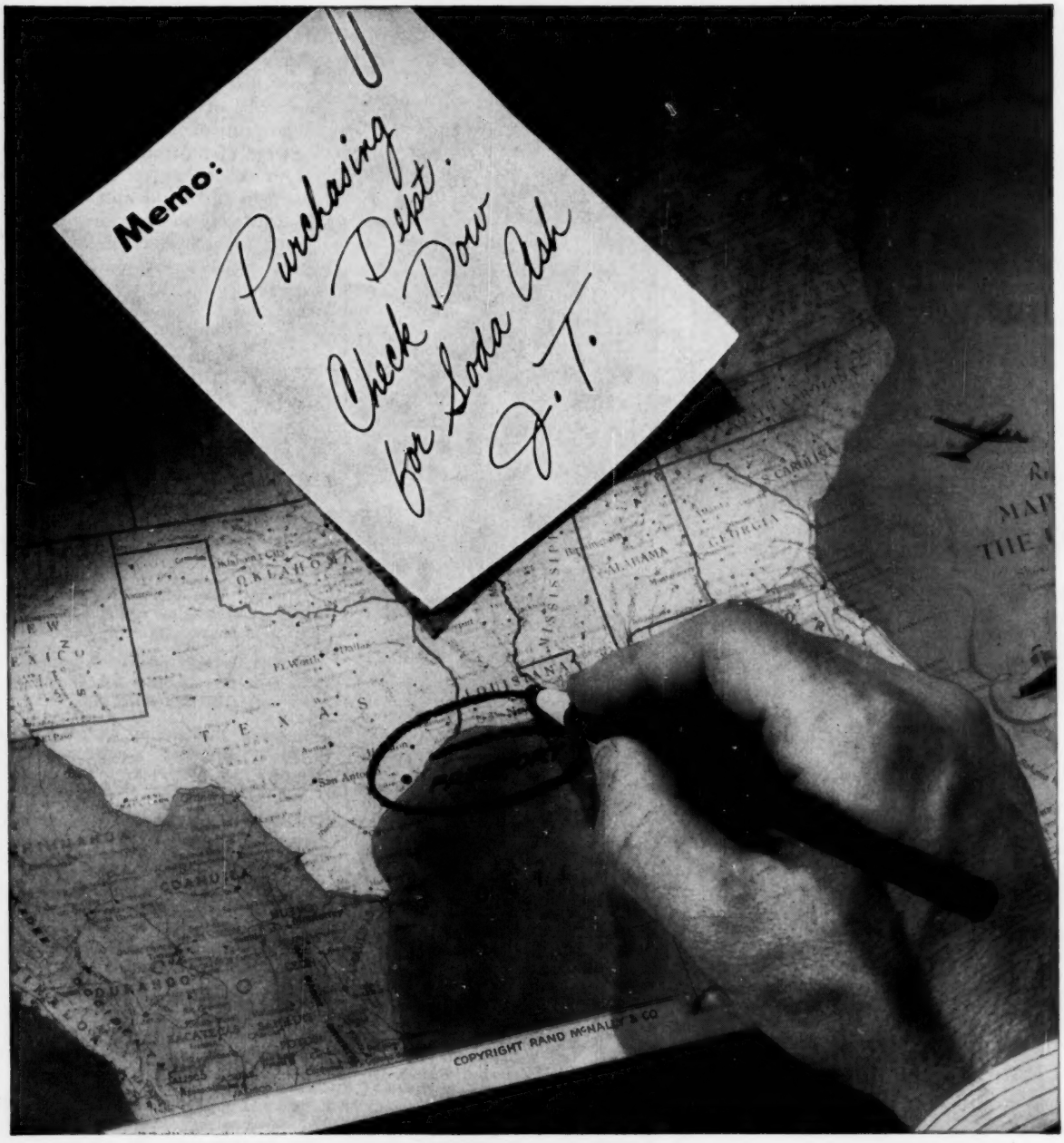
To THE EDITOR: I would like to call your attention to Mr. J. O. Jones' letter to the editor in your Opinion column on Aug. 29. He expressed amazement that Harvard University should overlook a particular point bearing on the engineering manpower article in your Aug. 3 issue. I have written Mr. Jones and advised him that Harvard University was not involved with this report and have asked him to read the introduction to the article and the footnote on page 46.

Please note that these references state that the report was written by

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: H. C. E. Johnson, Chemical Week, 330 W. 42nd St, New York 36, NY.

*Reprinted here with permission.—ED.



Soda Ash by Dow

If you have a plant in the Gulf South area, you now can look to Dow for your requirement of soda ash.

Dow is now producing 58% light soda ash in Freeport, Texas, by a new process that insures highest quality and uniformity. From this central location, Dow soda ash is shipped in 100-lb. bags and hopper cars to manufacturers of paper, aluminum, textiles, firms engaged in petroleum refining, oil well drilling, water conditioning and many other industries.

Wherever you're located in the Gulf South, you benefit from the many "extras" Dow can give you. Let us show you specifically what we mean. Contact the nearest Dow sales office or write to THE DOW CHEMICAL COMPANY, Midland, Michigan, Department AL 613C-1.

YOU CAN DEPEND ON DOW

OPINION

students at the Harvard Business School; and . . . this does not reflect the opinion of the business school or the university or that of the instructor in charge of the course.

It would be appreciated if you could help avoid these misunderstandings. Obviously the university cannot endorse or accept responsibility for reports written and published by students.

ROBERT L. WILEY, JR.
Graduate School
of Business Administration
Harvard University
Boston, Mass.

MEETINGS

National Electronics, 13th annual conference, Hotel Sherman, Chicago, Oct. 7-9.

Technical Assn. of the Pulp and Paper Industry, plastics-paper conference, Sheraton-Gibson Hotel, Cincinnati, Oct. 7-9.

Manufacturing Chemists' Assn., conference on precautionary labeling, Park Sheraton Hotel, New York, Oct. 9.

Chemical Institute of Canada, Biochemistry Division; symposium: the chemistry and physiology of fats; University of Ottawa, Oct. 9-11.

Committee on Vacuum Techniques, 4th annual symposium, Hotel Somerset, Boston, Oct. 9-11.

American Institute of Mining, Metallurgical and Petroleum Engineers and the **American Society of Mechanical Engineers,** 20th annual joint solid-fuels conference, Quebec City, Can., Oct. 10-11.

Salesmen's Assn. of the American Chemical Industry Inc., 6th chemical sales clinic, Roosevelt Hotel, New York, Oct. 14.

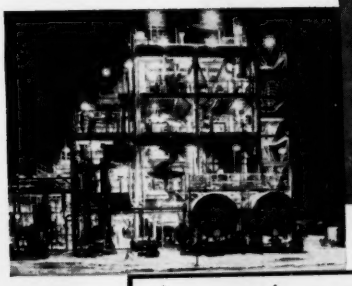
Time-Life International and **Stanford Research Institute,** international industrial development conference, Fairmont Hotel, San Francisco, Oct. 14-18.

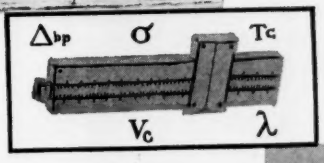
Assn. of Official Agricultural Chemists, 71st annual meeting, Washington, Oct. 15.

Society of Mining Engineers of The American Institute of Mining, Metallurgical and Petroleum Engineers, Southeastern mining conference, Hotel Hillsboro and Hotel Tampa Terrace, Tampa, Oct. 15-18.

Society of Plastics Engineers, regional technical conference; theme: polyethylenes: properties and uses; Hotel Carter, Cleveland, Oct. 17.

Technical Assn. of the Pulp and Paper Industry, 7th corrugated containers conference, Ben Franklin Hotel, Philadelphia, Oct. 23-24.

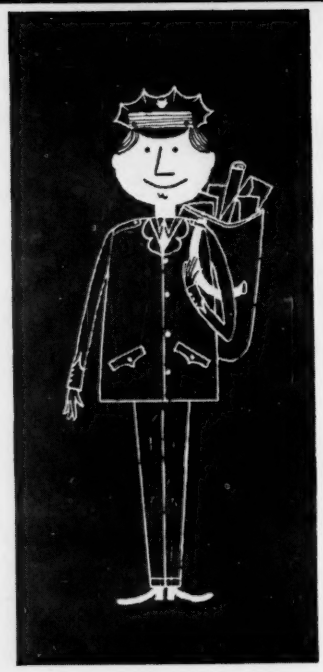




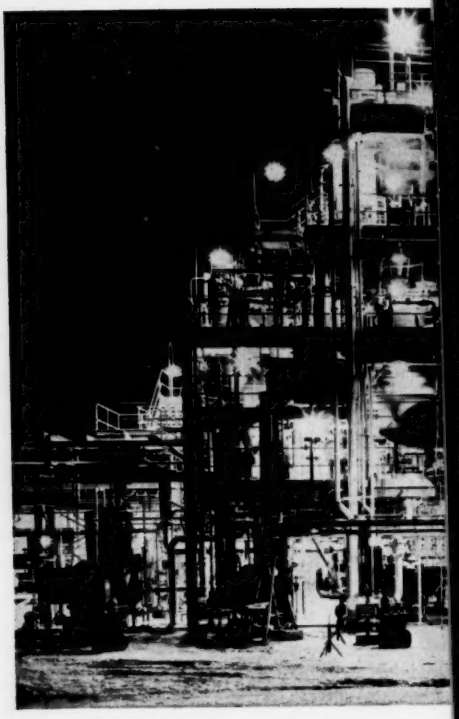
26

Double Your Ca . . Sell More . . . Sell Faster

Chemical Engineering

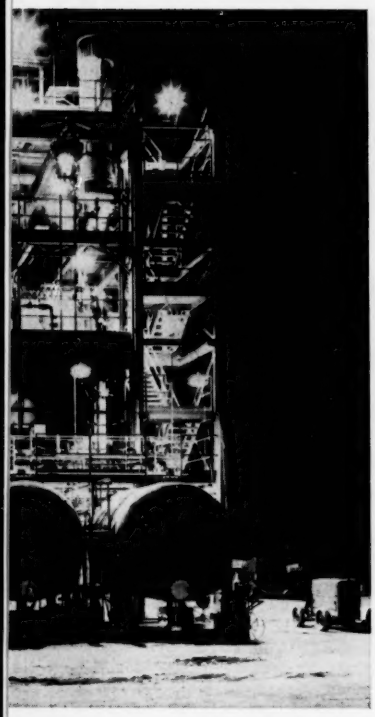


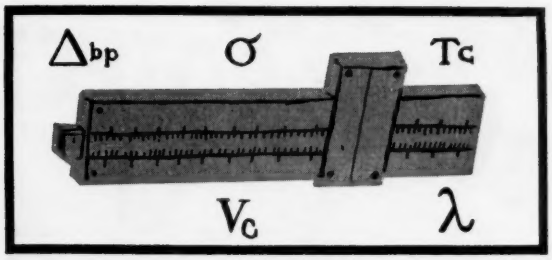
EFFECTIVE JANUARY 1958, CHEMICAL ENGINEERING WILL PUBLISH 26 TIMES A YEAR. Now you can get and keep the largest concentrated audience of key chemical engineers in industry on your side of the buying decision twice as often.



In the chemical process industries, an unprecedented rate o growth and technological advance. Particularly dramatic areas *Pharmaceuticals, plastics, petrochemicals.* Thorough in all areas CHEMICAL ENGINEERING's solid technical coverage of petrochemi cals and petroleum refining, for example, was a strong factor ir the discontinuance of Petroleum Processing. Already by far the preferred engineering magazine in these fields, only CE's broad scope can realistically anticipate and meet their expanding re quirements.

26





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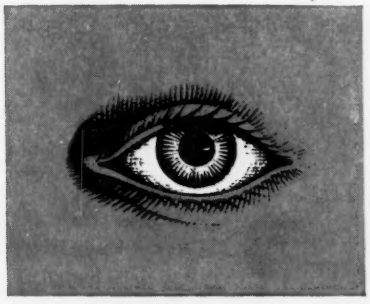

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Business Newsletter

CHEMICAL WEEK
October 5, 1957

Allied Chemical will boost its caprolactam monomer capacity to 60 million lbs./year. This adds new stimulus for the production of both nylon-6 fiber and molding resins. Allied is proceeding "immediately" to bring about the production step-up at its Hopewell, Va., plant; the increased output should be available by early 1959.

Allied's National Aniline Division opened the Hopewell plant in '55 to supply the monomer for Allied's Caprolan fiber. It's currently being enlarged to be able to make 30 million lbs./year. Within the past year, both Spencer Chemical and Foster Grant have started up nylon resin units requiring caprolactam monomer—which they buy from Allied.

•

National Petro-Chemicals polyethylene expansion has definitely been set for a Texas site. National has chosen a 200-acre plot on the Houston Ship Channel for its unit, which is designed to produce some 75 million lbs./year of intermediate density polyethylene.

•

How Du Pont will handle its General Motors stock is still a riddle. A Justice Dept. attorney, George Reycraft, last week rejected for the government Du Pont's own suggestions about the stock. In a meeting in Chicago between representatives of the government and the company, Du Pont had proposed that it (1) relinquish the right to vote GM stock it holds, (2) have its representation on GM's board of directors sharply limited, (3) be permitted to vote, only with court's permission, on GM matters important to stockholders. But the Justice Dept. stuck by its demands for full divestment of the stock, and Federal Judge Walter LaBuy gave the antitrusters 30 days to draft a counter proposal.

Du Pont will then have 60 days to criticize the government ideas; and to submit a new proposal of its own. The government has another 30 days to rebut other proposals and defend its own. General Motors seeks to file comments on all proposals, too.

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Reopening of Texas-U. S. Chemical's strike-bound Port Neches unit got under way Monday after a strike that lasted three months and 16 days. New contract agreements were reached last week between the company and the six unions involved. Members of the machinists, carpenters, pipefitters, painters and sheet metal workers unions jointly ratified the new agreements—details of which haven't yet been revealed. A local of Oil, Chemical and Atomic Workers Union, whose membership includes some 260 of the approximately 350 employees of the six involved unions, early last week ratified a new contract agreement with the company.

But 800 employees at Union Carbide's National Carbon plant are on strike this week. Terms of a wage-reopening clause couldn't be

agreed upon by the company and a local of Operating Engineers. Mass picketing of the Columbia, Tenn., electrode plant started last Friday, but an injunction against the union has since limited the picketing. No date has yet been set for further discussion of contract terms.

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Action in both Mexico and Canada interested chemical makers last week.

In Mexico, chemical industry leaders burst loose from the catch-all Camara trade group, the Nacional de Industrias de Transformacion (National Chamber of the Industries of Transformation), to form their own organization. Under a Mexican law, passed some 20 years ago, all companies must belong to a trade association. Now, 41 Mexican and foreign chemical firms, representing investments in Mexico totaling $80 million, have formed their own unit. It's expected that the new setup will be a strong force in the encouragement of U. S. and other foreign chemical investment in Mexico. The CNIT has for the past few years been governed by a group generally regarded as anti-United States.

In Canada, proposals by the British government that a free-trade area be set up between Canada and the United Kingdom faced an uphill fight. The area, designed to foster U. K. sales to Canada at U. S. expense, conceivably could take a real whack at U. S. chemical exports over the border. But Canadian officials have described the plan as "politically and economically impossible," though Canadian Prime Minister John Diefenbaker has not turned thumbs down on the proposal.

Elsewhere on the world chemical scene:

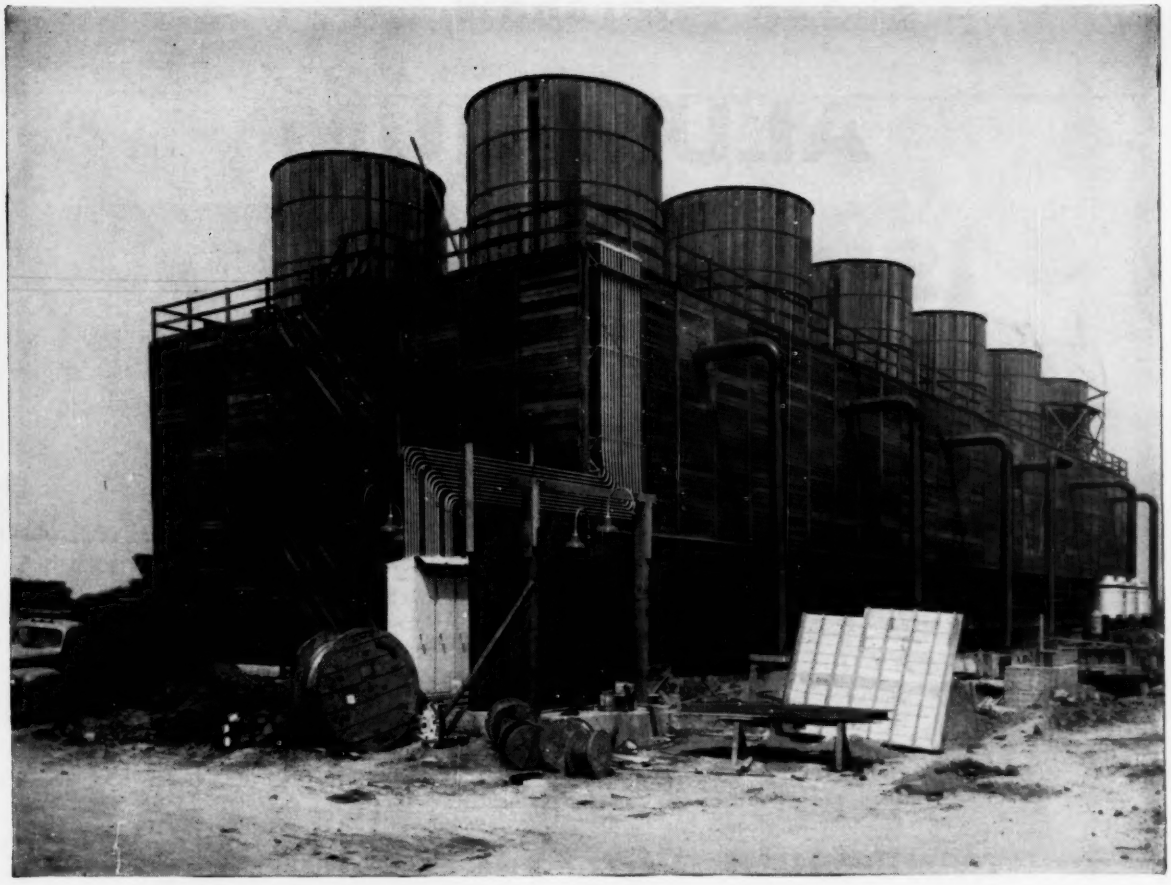
Reports from Red China indicate the first Red Chinese plant for making synthetic fibers will be completed near Peking by year's end. Capacity: 380 tons/year of nylon yarn.

In West Germany and England, prospects look bright. Imperial Chemical Industries reports a sharp rise in group sales and profits for the first half of '57, with sales at $685 million and before-tax profits at $86.6 million. Farbenfabriken Bayer (Leverkusen) expects a sales increase of $59.9 million in '57 over last year's $376.2 million.

•

Two new corporate moves made news. U.S.-held General Aniline & Film confirmed negotiations with Curtiss-Wright Corp. to establish a joint venture for making synthetic materials "including plastics." GAF feels the venture would provide it with a market for proprietary chemical formulations, while Curtiss would get a guaranteed raw material source for its Curon foam and other plastic products.

And, in Texas, Firestone is already planning expansion of its four-month-old butadiene plant at Orange. The company says continuing engineering studies are seeking "economical methods" to expand the 40,000-tons/year plant.



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Chemical Week

October 5, 1957

Chemical Corps' Appel: Fewer chemical contracts.

Defense Secretary Wilson: More budget cuts.

Setting the Stage for Government Cutback

The Defense Dept. is this week completing a detailed study to find out where it can cut another $2-3 billion from its budget. Part of Secretary Wilson's plan to pare military spending to $38 billion, the savings are sure to mean cuts in government contracts. And though exactly where the cuts will come is not yet known, chemical processors, along with the rest of U.S. industry, will likely be affected.

Although the chemical industry now gets only a relatively small portion of the estimated $12-15 billion of government contract work—the bulk goes into missile and aircraft development—there seem to be still further reductions ahead in the dollar value of chemical contracts, likely throughout the military services.

• Cuts in defense spending for aircraft has reduced demand for titanium. Missiles, now getting most of the emphasis, don't use as much of the expensive metal. There seems little immediate chance that the industry, currently operating at a 12,000-tons-a-year pace—60% below its present capacity—will step up output.

• "The number of chemical contracts will be considerably less than in previous years," says an industry liaison man, Col. John Appel, of the Chemical Corps' procurement office in New York. Chemical Corps contracts for fiscal '57 total only $18 million—68% below the $40.2 million allotted for fiscal '56. Research contracts farmed out by the Corps will be about $7.5 million, compared with $10.3 million in '56.

• Cuts in purchases by all service branches of such staple goods as medicinals, dyes, explosives, food preservatives and photochemicals also are in prospect. But they won't be as sharp as the reductions by the Chemical Corps.

Bright Spots: On the other hand, things may not be as bad as they seem right now.

That's because chemical companies aren't so steeped in government business that a cutback would cause irreparable damage. Most of the processors queried by *CW* say that government work that could be affected by budget cuts amounts to less than 5% of their over-all sales.

And AEC-sponsored work, say both industry and government officials, isn't likely to suffer any severe cutbacks. Also, such high-priority projects as high-energy-fuel research, now carried on by Olin Mathieson, Callery Chemical and several others, aren't likely to be abandoned *(see also p. 22)*.

There's even some cheer for titanium producers. Despite the recent cutbacks in government buying, producers feel that the metal will find plenty of uses in other fields because of its uniquely high strength-to-weight ratio and other properties.

Kennecott Copper and Allied Chemical are going ahead with plans to build their jointly owned titanium plant. It will process an estimated 7,000 tons/year of primary titanium, is scheduled to be operating by the winter of '58.

With the possible exception of titanium, government work will ease up only gradually, giving chemical companies a chance to build up other areas of their business to offset the decline. And most agree that chemical processors, not overly dependent on government business, won't have much trouble avoiding major setbacks.

With this new $5.5-million layout in Beverly, Mass., designed for the Navy, Metal Hydrides is . . .

Filling in the High-Energy-Fuels Picture

Last Friday, Metal Hydrides (Beverly, Mass.), made its bid for a share of the big high-energy fuels market when it formally dedicated its $5.5-million Navy plant to make sodium borohydride.

Although both the Air Force and the Navy keep a security lid clamped on most aspects of the program, enough information had been released to give a fairly good broad picture (*CW, July 20, p. 35*). Metal Hydrides has now filled in some of the remaining pieces. It says, for instance, the sodium borohydride plant is capable of producing several tons/day. Further, it says that borohydride can now be made to sell for $3-5/lb.

Previously, the firm's researchers had been talking about $10/lb. as an attainable price for the compound when it was made in "really volume production." The Navy had said that the contract with Metal Hydrides called for delivery of $9.2 million worth of sodium borohydride over an 18-month period. That put top limit of the plant at 600,000 lbs./year.

At $5/lb., however, it could deliver 1.2 million lbs./year. Since the product is destined for Olin Mathieson's Navy plant at Model City, and since it takes 2 lbs. of sodium borohydride to make 1 lb. of penta- or decaborane, the capacity of the plant there would be 600,000 lbs./year. Using Olin Mathieson's scale-up factors (*CW Technology Newsletter, July 13*), the large Air Force plant would have a capacity of 2.75 million lbs. Considering probable losses in the system, this would agree with *CW*'s earlier estimate of 2.25 million lbs. for that plant.

The "several tons/day" capacity and the lower price limit ($3/lb.) would, of course, indicate a minimum designed capacity of 2 million lbs. annually for the borohydride operation. But that could easily be the extra cushion the Navy would want in a plant operating in such a new field. And if it should prove capable of hitting designed capacity, the Navy would get more borohydride cheaper.

Partly Private: The plant itself is located at Danvers, 5-6 miles outside of Beverly, Mass. Metal Hydrides spent about $1 million for land, servicing buildings and sidings. The Navy paid for all the equipment—$4.4 million.

The process that will be employed is one worked up by the company out of its own funds. Lew Davis, president, gives credit for it to Douglas Banus, director of research and development, and to Frank Wilson, the plant engineer who adapted it to commercial equipment.

But he also cites Badger Mfg. Co. (Cambridge, Mass.) with having made a "major contribution" in equipment design engineering.

One portion of the process starts with a packaged Girdler unit to make hydrogen from propane. Sodium brought in by tank car is slurried with a mineral oil under an atmosphere of hydrogen to make sodium hydride in oil dispersion.

In another portion of the plant, boric acid is reacted with methanol to form trimethyl borate.

In the final reaction, sodium hydride and methly borate react to form sodium borohydride and to regenerate methanol.

Pulp and Resins: Most of the interest in borohydrides right now centers on their ability to react with a boron halide to form diborane, building block for the high-energy boron fuels. But Metal Hydrides feels that both potassium and sodium borohydride have other solid commercial prospects.

It points to the considerable work done on sodium borohydride, for example, to treat wood pulp, modify cellulose and to foam organic resins and even inorganics.

Banus even sees the possibility of an eventual price in the $1-2/lb. range. For one who helped nurse the chemical to plant-scale production, such optimism is understandable.

Teamed for Future in Fuels

Hooker Electrochemical and Foote Mineral Co. last week detailed to CW plans for a proposed jointly owned plant to make lithium perchlorate missiles fuel. Moreover, in another joint venture, American Potash, National Distillers, and Food Machinery are teaming to produce high-energy fuels—reportedly boron-based—in Henderson, Nev.

As explained by board chairman Gordon Chambers, Foote's present plans call for a unit adjacent to Hooker's sodium perchlorate plant in Niagara Falls, N.Y. Sodium perchlorate, of which Hooker is the largest U.S. producer, is a starting material for the lithium product.

Hooker would pipe the solution of sodium perchlorate directly into the lithium perchlorate facilities without crystallizing it.

Defense contractors, conferring with officials of both companies have indicated that the idea would work out well if the Defense Dept. would give its official blessing. But the department is traditionally slow-moving on such things, and neither Chambers nor Hooker's board chairman, R. Lindlay Murray, expect anything definite for several weeks.

Ammonium Perchlorate Now: The government is using ammonium perchlorate as a solid rocket fuel. Preliminary tests, however, have reportedly shown that the lithium compound, because of its smaller molecular weight and other properties, may be more efficient.

Chambers points out that the proposed unit would be set up to make either ammonium or lithium perchlorate in large quantities. "The only limit would be set by Hooker's sodium perchlorate capacity—and it's the largest U.S. producer. We [Foote] have plenty of lithium."

The Defense Dept. now buys ammonium perchlorate from the Navy, which has a plant in Henderson, Nev., operated by American Potash. But contractors say two sources of supply would be better—and they're trying to get Defense to agree.

Actually, Foote has for some time been making lithium perchlorate in pilot-plant quantities at its Philadelphia complex and shipping it to defense plant contractors. However, Chambers points out, the quantities are extremely small, nowhere near the potential of the proposed unit in Niagara Falls.

Officials of both firms say the proposed plant would require a relatively small capital investment. As long as requirements didn't exceed Hooker's sodium perchlorate capacity, equipment expense would be fairly low. If demand for sodium salt should pass supply, Hooker might have to add the new production equipment that would be necessary.

Less of a Gamble: Also, Chambers adds, "The joint venture would be less risky for both of us." He refers to the fact that defense needs can change quickly (*see p. 21*) due to international developments and to new fuel research.

But, though both companies seem to be enthusiastic about the project, they're still wary of changing defense needs. Neither has drawn up any definite plans as yet. Both are waiting to see if the prospects look firm enough to make the venture worthwhile.

Triple Effort: American Potash will operate the plant it is building with National Distillers and FMC. The new combine, which will be one-third owned by each of the three firms, is called A.F.N. Inc. The Air Force has awarded the group a contract covering process development and semi-pilot work on boron-based fuels.

The Air Force has already awarded a $40-million contract to Olin Mathieson to make boron fuels at Niagara Falls, N.Y. And the Navy has a $35-million contract with Callery Chemical to produce them. But it is thought that A.F.N. will concentrate on making even newer experimental fuels.

It's thought that both liquid and solid fuels will be produced at the proposed A.F.N. plant. While most boron fuels used to the present time are liquid, American Potash is now pilot-planting decaborane, a solid, that could conceivably be used in rockets.

As the Hooker-Foote, Metal Hydrides and A.F.N. projects indicate, the high-energy-fuel business is growing fast. And, taking a cue from the ever-growing commercial promise of rocket fuels, still other companies are checking to see where high-energy-fuel production can fit into their corporate structures.

Answer to Antitrusters

Last week, Union Carbide revealed the gist of arguments it will use to fight charges that it violated antimerger laws in acquiring Visking Corp. (Chicago, Ill.) The arguments were in Carbide's answering brief to a Federal Trade Commission complaint filed against the company last July (Business Newsletter, July 20).

In reply to the charge that the merger will prevent other companies from getting a just share of the market, Carbide's attorneys say the company is subject to "substantial competition not only from other manufacturers of polyethylene film but also from manufacturers of other packaging materials." They name cellophane, coated and uncoated foils as examples of major competition.

The brief further contends that the Visking merger doesn't put Carbide in a position to control prices, since these other compounds (cellophane, aluminum foil, coated papers, etc.) "have the same end-uses as, are acceptable substitutes for, are functionally interchangeable with, and are in the same relevant markets as polyethylene film."

Charges to the effect that Carbide supplied almost all of Visking's polyethylene resin requirements in '55 and '56 weren't answered fully—though Carbide does agree it sold about $16 million worth of resins to Visking in '55 and close to $18 million in the following year.

And while Carbide denies that it gave Visking exclusive discounts on the purchase of polyethylene resins, the brief admits to "entering into an agreement" with Visking. Carbide's attorneys offer to "give a full and complete" explanation of this agreement at a later hearing.

In effect, Carbide denies most important FTC charges and asks that the complaint be dismissed. However, most observers feel that the case will not be dropped, because the charges allege a violation of the Clayton Act, the same law that applied to the lengthy Du Pont-General Motors stock disposal case.

Dim Fate for Protein Fibers

Have protein-based fibers lost out to other types of synthetics in the scramble for the world's textile markets? Two events of the past few weeks have set textile makers wondering: Virginia-Carolina's admission that it is considering selling its interest in Vicara; and the scheduled closing of Imperial Chemical Industries' Ardil plant in Ayrshire, Scotland.

Although Virginia-Carolina hasn't yet made it official, it reportedly wants to sell all or part of its interest in Vicara—the fiber derived from the corn protein, zein (*CW Business Newsletter, Sept. 28*).

The wool-like protein fibers, which have been market factors for less than a dozen years, have never had an easy time of it. Vicara, more closely related to wool in chemical properties and structure than any other man-made product, never achieved the sales volume predicted for it. Only eight years ago, when V-C opened its Norwich, Conn., plant, officials envisioned 50-million-lbs./year sales by '55. Total '56 Vicara production has been estimated at 5 million lbs. and '57 production may be less than 3 million lbs.

Behind the Cutbacks: Production cutback of Vicara and the complete shutdown of Ardil—made from peanuts—stem from a variety of shortcomings. For one thing, they are both relatively weak fibers—particularly when wet. While the protein synthetics resemble wool in many ways and offer a prime advantage, low cost, they don't approach the toughness and water resistance of Dacron, Acrilan and Orlon.

Then, too, Vicara and Ardil didn't receive the promotion needed to publicly launch a new synthetic. V-C initially pushed Vicara by tagging it as a blending fiber; Vicara was known as "the fiber that improves the blend." But the firm never gave Vicara heavy consumer-level promotion.

Although Ardil got more publicity than Vicara, at least in the English market area, ICI now concedes that it was the wrong kind of publicity. Ardil was dubbed a "wool substitute" when industry and the public were still highly suspicious of man-made materials.

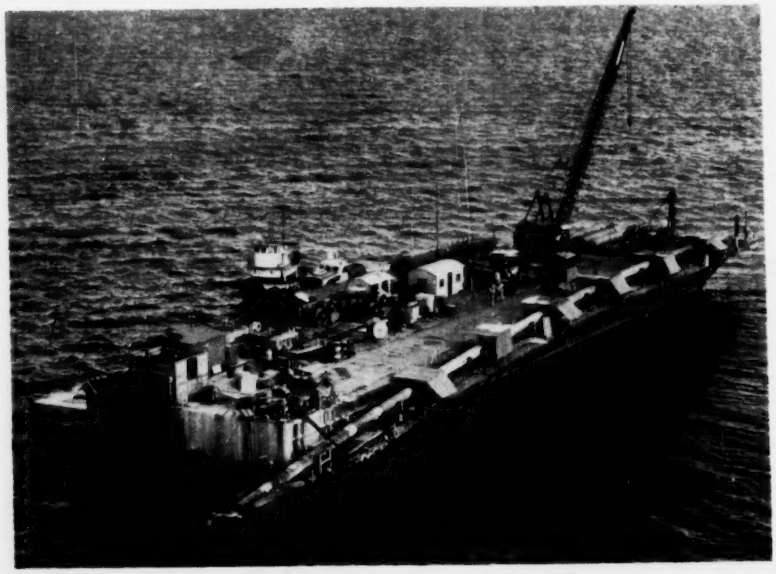
A third important handicap for the protein fibers was that blends are basically a small market. "There's a limited field for soft cashmere-like fabrics. "It's not a big enough market to justify promotion," say trade sources. The research needed to expand the market, some say, has never been forthcoming.

But the protein fibers do offer some real advantages. They do not shrink, have greater resistance than wool to alkali, are resistant to moths and mildew and can be dyed easily. And, like wool, they have high wrinkle recovery and warmth. Most important, they can be made at a low cost. Unbleached Vicara sells for $1/lb.; bleached, $1.10/lb. Fine wool is now at $1.62/lb. and Orlon sells for $1.20-$1.48/lb. depending on the denier. The very small amount (20,000 lbs.) of Ardil imported for use in hats, sells for 82-89¢/lb.

Plant Fates: There appears to be no immediate buyer in prospect for V-C's Vicara plant. Corn Products Sales Co.—V-C's sole supplier of the raw material—is reportedly a likely customer. But reports are that it really doesn't want the plant. ICI declines to say what plans it has for its six-year-old, $7-million Ardil factory. Although the exact closing date hasn't been set, the plant's 220 workers are being offered positions at other ICI plants.

Now that Ardil is heading out of textiles, and since Vicara, the only protein-based fiber in the U. S., can't seem to make a go of it, only two large-scale commercial man-made protein fibers are left. Both are derived from casein and are manufactured in Europe. Merinova, made by Italy's Snia Viscosa, and Fiberlane, manufactured by England's Courtaulds, are both designed to resemble wool and to be used with it.

How well these protein fibers will fare in the competitive fiber market remains to be seen; the experience of their American relatives is not very reassuring.



Pushing a Pipeline into the Gulf

Inching ahead in the Gulf of Mexico a pipe-laying barge reels off part of a 60-mile underwater line near Cameron Parish, La., that will connect the producing wells of Continental, Atlantic, Tidewater, Cities Service and Magnolia-Continental-Newmont Oil companies with Tennessee Gas Transmission Co.'s compressor station at Kinder, La. The pipeline—designed to tap 1.7 trillion cu ft. of gas reserves—is slated for completion this December. Contractor is Brown & Root (Houston).

EXPANSION

Iron Ore: Ashland Mining Co. plans to build Wisconsin's first low-grade iron-ore pellet plant. Site of the $50-million project: Agenda, Wis. An estimated 250 million tons of mineable iron-bearing ore is on land owned or leased by Ashland at this location.

•

Pulp Mill: Alaska Lumber and Pulp Co. (Japanese-owned) is adding $500,000 in antipollution equipment to its $55-million investment in a new pulp mill at Sitka, Alaska. Pollution experts recommended that waste from the mill be carried by pipeline to Silver Bay, east of Sitka, rather than being discharged directly at the mill site.

•

Lustrex: Monsanto Chemical Co.'s Plastics Division plant (Springfield, Mass.) plans to more than double its Lustrex high-impact styrene production capacity by next May.

•

Consumers Public Power District, of Columbus, Neb., and the Atomic Energy Commission reached agreement last week on contract terms covering the construction and operation of a large-scale nuclear power plant at Hallam, Neb. AEC, with Consumers' assistance, plans to construct a sodium-cooled, graphite-moderated reactor designed to produce 75,000 net kilowatts of electricity.

COMPANIES

Weyerhaeuser Timber Co. was granted a one-year extension of a waste discharge permit for its Everett, Wash., sulfite pulp mill by the Washington Pollution Control Commission. Weyerhaeuser is conducting extensive research to find a new way to recover pulp mill wastes. One process, now being tested in a pilot plant, will require about a year to evaluate.

•

Three firms, Riverside Cement Co., Hercules Cement Corp. and Peerless Cement Corp. approved plans for merger last week. Boards of directors of the companies hope the agreement can be submitted to stockholders soon enough to allow completion of the merger by December. The firms would have a total annual capacity of some 18.5 million bbls.

•

Shawinigan Chemicals Ltd., B. A. Shawinigan Ltd. and St. Maurice Chemicals Ltd., all subsidiaries of Shawinigan Water and Power Co., Ltd., report consolidated earnings of $6 million in the first six months of '57, compared with $5.4 million last year.

•

Phillips Petroleum Co., under terms of a contract signed with the Atomic Energy Commission last week, will provide uranium concentrates to AEC a $9.5-million uranium processing mill that will be built 25 miles north of Grants in McKinley County, New Mexico. The Phillips mill will have a rated capacity of 1,725 tons/day. Construction will begin at once; the mill should be in production by mid-'58. Only mill now operating in the Grants district is the 3,000-tons/day Anaconda plant at Bluewater.

•

American-Marietta Co. authorized a three-for-two split of its common shares after reporting record high sales and earnings in the first nine months of '57. Shareowners will receive one additional share for each two shares held as of Sept. 27. Net sales of $59.1 million for American-Marietta and subsidiaries during the quarter ended Aug. 31, '57, were an increase of 16.2% over sales of $50.8 million in the same period a year ago. Net income for the third quarter was 13.7% higher than last year.

•

Olin Mathieson Chemical Corp. plans to sell $60 million of subordinate debentures convertible into common stock, to provide additional working capital.

FOREIGN

Polyvinyl Chloride/Argentina: Electroclor, S.A.I.C., Argentine chemical firm, will build a $10-million polyvinyl chloride plant in the town of Capitan Bermudez, Argentina. Designed by Imperial Chemical Industries of England, the new unit will have a capacity of 4,000 tons/year, will be financed by Celulosa S.A. and Industries Quimicas Duperial S.A.I.C., two of Electroclor's major stockholders. Some shares will also be sold to the public.

•

Earnings Report/Italy: Montecatini reports its first-half sales are up 6% over last year. On June 30, the balance sheet showed sales of $152.3 million, compared with $143.8 million during the first six months of '56. Six-month profits had a more moderate gain, from $9.4 million in '56 to $9.8 million this year.

•

Titanium Pigment/Mexico: Glidden Co. and Quimicas Basicas (Mexico) will build a jointly owned plant near Vera Cruz, Mex., to produce titanium dioxide pigment. Total cost: $6.4 million.

•

Detergent/India: Swastik Oil Mills, Ltd., Indian petrochemical firm, is planning a new synthetic detergent unit near Bombay, India. The plant, first of its kind in India, will be designed and engineered by Foster D. Snell Inc. (New York).

•

Equipment/England: Sharples Corp., Philadelphia processing equipment maker, has a new British subsidiary, Sharples Centrifuges, Ltd. (Camberley, Surrey, England). A new factory and office building were put into operation last week.

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With great expectations and a kittenish confidence, Argus Chemical was born just ten years ago—in October, 1947. We are naturally pleased that we have not only survived but flourished . . . thanks to you.

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Washington
Newsletter

CHEMICAL WEEK
October 5, 1957

A tougher line on advertising claims is shaping up in Washington. It's coming on many fronts. Main attacks are aimed at products made by the chemical process industries—notably proprietary drugs and chemical food additives. Criticism of excessive advertising claims now is harsher than ever. It may build up enough steam to quickly push restrictive legislation through Congress.

Most of the critical talk emanates from Washington—but not all of it.

In Boston, for example, the nation's top pediatricians, steamed up over "ad" claims for a number of baby products, have set up the Physician's Council for Information on Child Health to mobilize MD pressure on drug and cosmetic management to curb "ad" abuses in promotion to the medical profession.

Keep an eye on the Continental Baking Co. case. Last week, Attorney General Brownell, amid a fanfare of publicity, filed an injunction suit to bar promotion of so-called buttermilk breads as enriched bread containing nitrated flour—an additive barred by the Food & Drug Administration from enriched white bread. Brownell won a restraining order good until Oct. 2, when the case came up in federal district court for the District of Columbia.

This case marks the first salvo in a new government campaign not only to enforce bread ingredient labeling rules (with chemical additives the chief ingredients involved) but also to take a firmer line on claims for drugs and cosmetics.

The significant point is that FDA—which did the "leg work" in the Continental case—for the first time can count on the enthusiastic backing of both the Justice Dept. and Federal Trade Commission. This gives FDA full use of their potent legal armament. Worried trade executives now are digging back in their files to reread the warnings given last spring by FTC Commissioners Secrist and Anderson of a crackdown on bakery product claims, and "more and harsher regulation" and new laws to curb advertising abuses by business generally.

Congress is already examining the need for tougher laws. Rep. Blatnik's House Government Operations Subcommittee has circulated for agency comment a list of proposals—including prepublication government approval of all drug advertisements; switching the burden-of-proof in ad claim cases from FTC to the advertising firm; providing for "automatic" injunction barring use of advertising claims when the Post Office Dept. orders a ban on mail-order claims for the product. Blatnik complains of FTC's slowness in initiating and processing ad cases; he says his proposal would give FTC and FDA, when operating in the nonmail-order realm, the benefits of the Post Office's "swift and certain justice."

Washington Newsletter

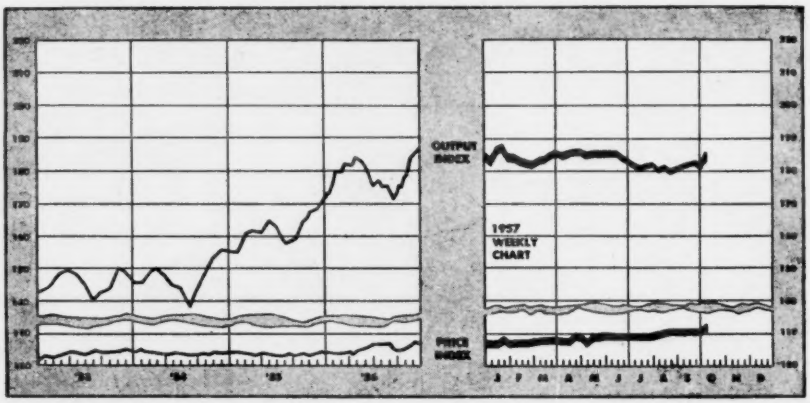
(Continued)

FTC and the Post Office won't buy all of Blatnik's package. They say some of his proposals are extreme, would violate respondents' constitutional rights. While FTC and FDA complained at Blatnik's advertising claim hearings last August of court-imposed obstacles to convictions, they'll oppose new laws, instead will request more money and larger staffs.

•

Water pollution control spending will hit full stride now that the Budget Bureau has finally released the $57 million Congress previously okayed for the federal program in fiscal '58. Until last week, budget officials kept the Public Health Service in doubt as to whether they'd get an okay to spend all the money, or whether they would have to continue on quarterly rations geared to last year's low spending rate. The pollution funds provide $45 million for sewage plant construction; $3 million in 50-50 matching grants to beef up state enforcement agencies; $1,070,000 for research; $980,000 for technical assistance; $500,000 for basic data studies; and $350,000 for federal enforcement work.

The delay in releasing funds did hurt, though. Insiders report that the water pollution staff and other outfits whose money was, or still is, being held up by the Budget Bureau have lost more key technicians to industry than ever before. They were "fed up—not knowing whether we would have a program," one explained. But few agencies are feeling real hardships from personnel losses.



Business Indicators

WEEKLY	Latest Week	Preceding Week	Year Ago
Chemical Week output index (1947-49=100)	187.5	185.0	175.1
Chemical Week wholesale price index (1947=100)	111.0	111.1	105.5
Stock price index of 11 chemical companies (standard & Poor's Corp.)	40.75	42.36	44.78

MONTHLY Production (Index 1947-49=100)	Latest Month	Preceding Month	Year Ago
All manufacturing and mining	144.0	135.0	142.0
All chemical products	182.0	175.0	172.0
Industrial chemicals	203.0	197.0	188.0

ACETALDEHYDE AMMONIA
ACETOPHENONE
ACETYL CHLORIDE
ANISIC ALDEHYDE
ANISYL CHLORIDE
ANISYL CYANIDE

BENZALACETOPHENONE
BENZHYDROL
BENZHYDRYLAMINE
BENZHYDRYL CHLORIDE
BENZOPHENONE TECH.
BENZYL ALCOHOL TECH.
BENZYL CYANIDE

n-CAPROIC ACID
CAPRYLOYL CHLORIDE
p-CHLORBENZHYDRYL CHLORIDE

Intermediates

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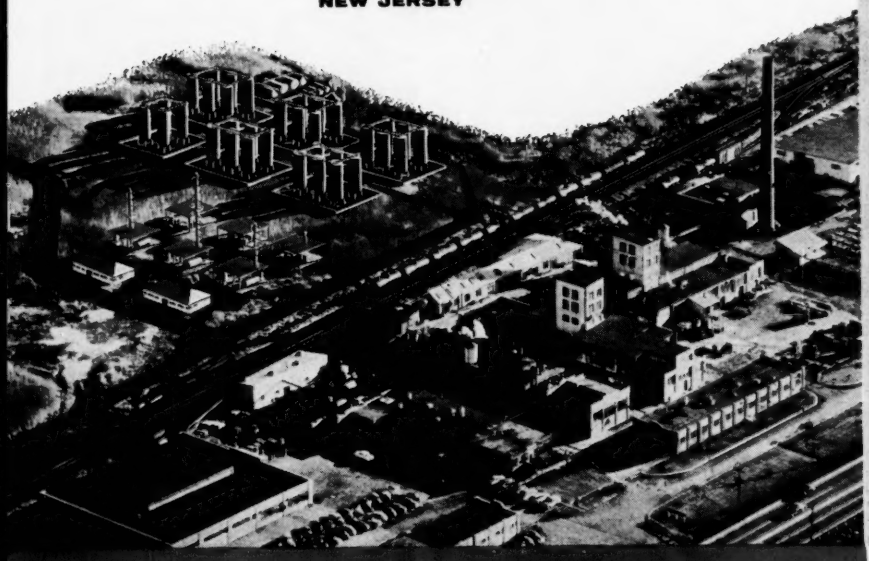
DICYCLOHEXYL KETONE
p, p'-DIMETHOXYBENZOPHENONE
DIPHENYL ACETONE (unsym)
DIPHENYL METHANE
ETHYL FORMATE
ETHYL MALONIC ESTER
ETHYL PHENYLACETATE
beta IONONE
ISOVALERIC ACID
LAUROYL CHLORIDE
p-METHOXY PHENYLACETIC ACID
METHYL HEPTENONE
METHYL PHENYLACETATE
MYRISTOYL CHLORIDE
PALMITOYL CHLORIDE
PHENYLACETIC ACID
PHENYL PROPYL ALCOHOL
PHENYL PROPYL CHLORIDE
POTASSIUM PHENYLACETATE
PROPIONYL CHLORIDE
PROPIOPHENONE
SODIUM PHENYLACETATE
n-VALERIC ACID
And Other Intermediates



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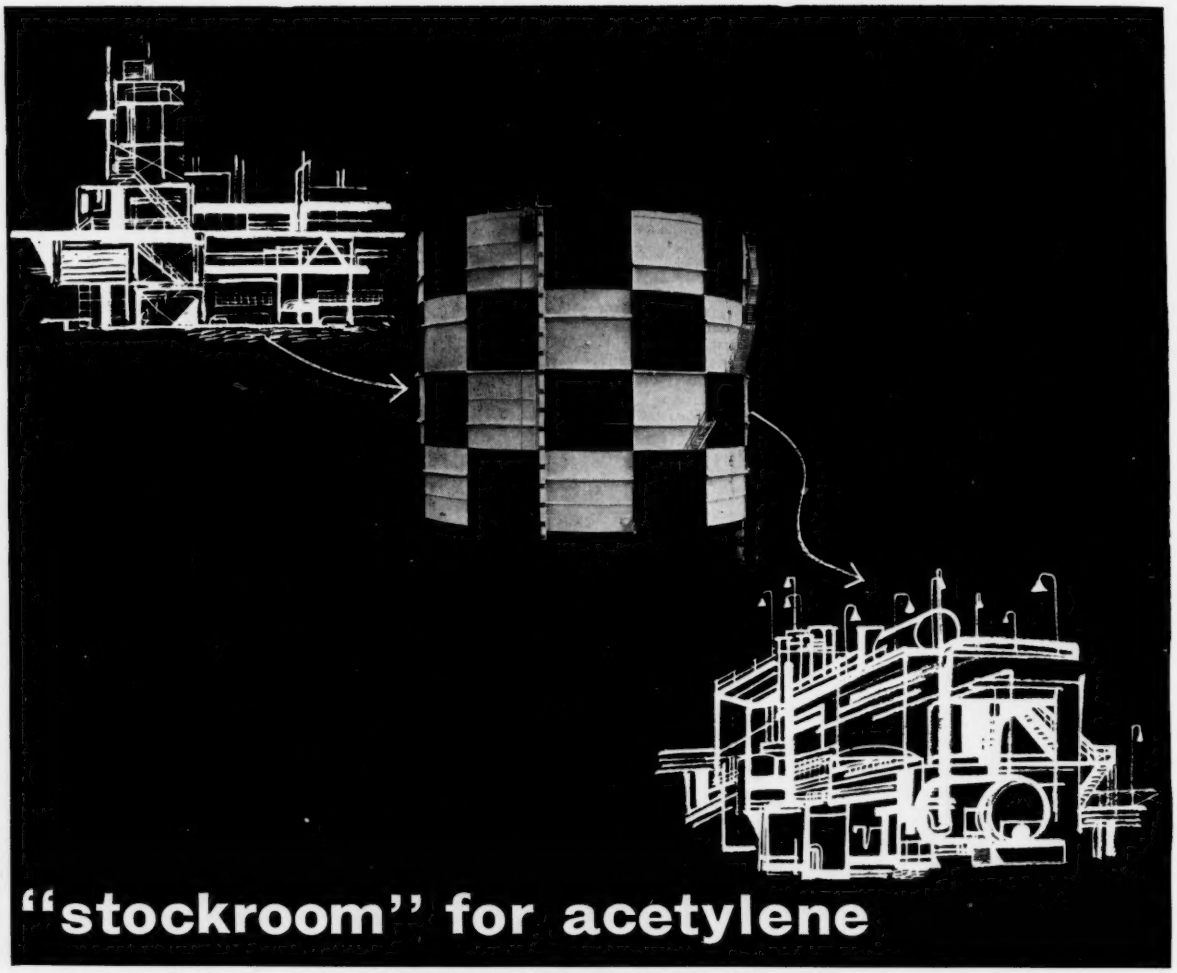

"stockroom" for acetylene

Linde Company* purchases Wiggins Gasholder for storage of acetylene between production and use cycles

Ever since the Linde Company's new acetylene plant in Montague, Michigan went "on stream", a new 100,000-cubic-foot Wiggins Gasholder has played a vital role in the operation. Every cubic foot of acetylene produced passes through the "stockroom" on its way to DuPont for use in the production of Neoprene. The gasholder provides acetylene storage and serves as surge capacity to enable Linde to satisfy both normal and emergency requirements.

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Offices in Principal Cities

Heavy-Water Process Takes a Big First Step

For a subject that has been declassified for eight months, heavy-water production has elicited precious little public attention. In fact, the latest improvements in the Atomic Energy Commission's three-step route are still cloaked in secrecy imposed by a federal court order. But by this week, enough information may be pieced together to allow private industry to select the most likely route for commercial heavy-water production.

The secrets that make the process economical are contained in a patent application made in 1950 by Jerome S. Spevack (New Rochelle, N.Y.) and promptly veiled by AEC. When the commission declassified all its heavy-water secrets on Feb. 1 and prepared to publish them, Spevack stepped in with a unique suit (*see p. 52*). He claimed that the information contained in his application in '50 was not AEC's to reveal, that he should be given time to make application for foreign patents on the process improvements.

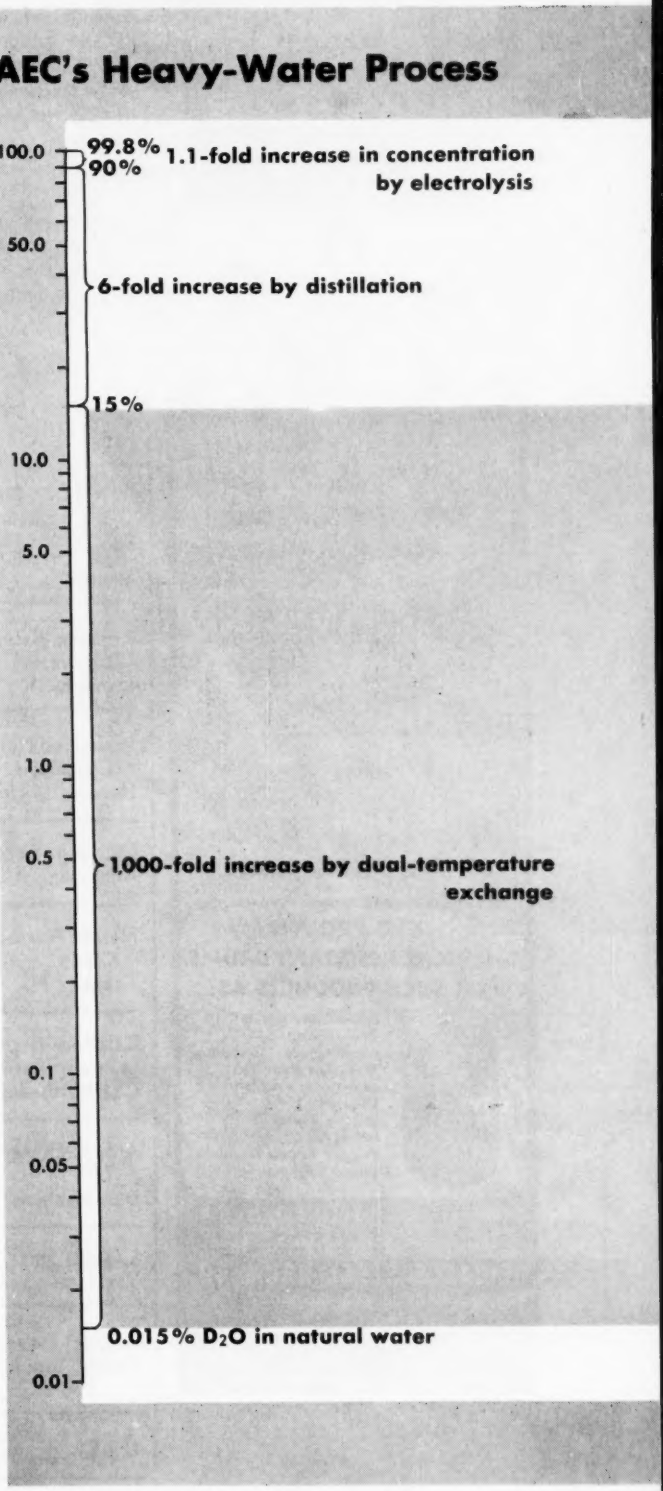
On April 10, a federal judge issued a court order restraining AEC from divulging any of the contested secrets until a final decision could be reached. As a result of this routine action, Spevack gained valuable time in which to file for foreign patents.

The principle—dual-temperature exchange—of Spevack's method is no secret. It is described in U.S. Patent 2,787,526, issued to him April 2 and assigned to AEC. Application for this patent was made in '43 and also was kept under wraps until the declassification order. Without the improvements, however, the method presents obstacles to economical operation.

Basic Process: Broadly speaking, the AEC route to heavy water consists of three steps. The dual-temperature method is used only in the first step—bringing the deuterium oxide (heavy water) concentration in water from its naturally occurring 0.014-.015% up to 15-20%. The crude product is then distilled (D_2O boiling point: 101.4 C) until the moment that concentration is up to about 90%. Final purification to 99.8%—step three—is effected by electrolysis (H_2O dissociates more readily than D_2O).

Step one, involving a 1,000-fold increase in the heavy-water concentration, is by far the most important; the dual-temperature exchange really does the bulk of the process's work and contributes more than 90% of both capital and operating costs. AEC is satisfied that it is the best method of treating the large volumes of water involved in bringing 150 ppm. of D_2O up to the required concentration.

The process variation perfected by Spevack employs deuterium exchange between hydrogen sulfide and water. The equilibrium ratios between these two mate-



rials and their deuterium-containing counterparts are such that high temperatures favor deuterium-rich sulfide, while lower temperatures promote enrichment of the water.

Thus, when natural water and hydrogen sulfide are run through a hot tower at, say, 100 C, deuterium in the water exchanges with hydrogen in the sulfide to produce a sulfide product relatively rich in deuterium. This sulfide and water of normal deuterium content are run through a heat exchanger and a cold tower (e.g., at 25 C), reversing the equilibrium and causing the water to be enriched by the high-deuterium sulfide. Additional cycles allow the enriched water to be raised to a D_2O concentration that can be handled efficiently by another method, e.g., distillation.

Although full disclosure of the important process improvements must await issuance of at least one of Spevack's foreign patents, it's not too difficult to spot the areas in which improvements probably lie. For instance, difficulty of process control has been mentioned as a drawback to the method—a problem that is best tackled in the design stage. And increasing heat efficiencies is a likely area to watch; this is the basis of the operation, and savings here are likely

Heavy-water-moderated reactors for nuclear power plants are planned by:

Group	Reactor Type	Power (kw. elec.)	Startup
Argonne National Laboratory Lemont, Ill.	Boiling water (EBWR)	5,000	1958 (switch from light to heavy water)
Wolverine Electric Cooperative Hersey, Mich.	Aqueous homogeneous	10,000	1959
Chugach Electric Assn. Anchorage, Alaska	Sodium-cooled	10,000	1962
Florida Nuclear Power Group Tampa, Fla.	CO_2-cooled	136,000	1962
Carolina-Virginia Nuclear Power Assn. Charlottesville, Va.	D_2O-cooled	17,000	1962
Atomic Energy of Canada, Ltd. Des Joachims, Ont., Can.	"	20,000	1959
Swedish State Power Board Vasteraas, Sweden	" (Adam) (Eve)	75,000 (heat) 100,000	1960 1963
Atomic Energy Co. Farsta, Sweden	" (R3a) (R3b)	76,000 (heat) 14,000	1960 1961 (switch from R3a)
U.S.S.R.	CO_2-cooled	100,000	1960

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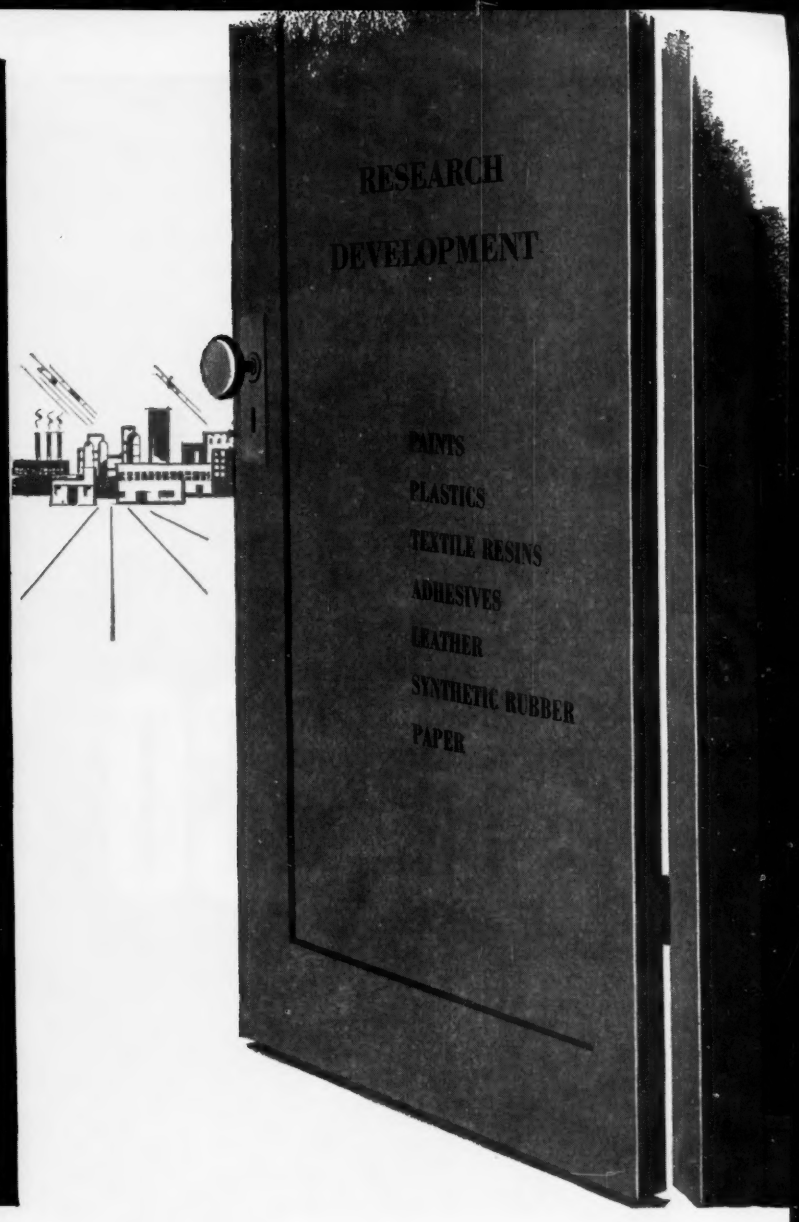

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	VINYL ACETATE	VINYL PROPIONATE	METHYL ISOPROPENYL KETONE
	Descriptive Data	Descriptive Data	Descriptive Data
Distillation Range @ 760 mm, °C	71.8-73.0	within 1° (including 94.9)	98 (true boiling point of pure product)
Color APHA, max.	5	10	water-white
Water, % wt., max.	0.15	0.15	1.5
Specific Gravity @ 20°/20°C	0.9330-0.9340	0.9170-9180	0.8555-0.8565
Acidity as acetic acid, % wt., max.	0.02	0.1	—

Celanese CHEMICALS

Spevack: 'Private industry can beat AEC's $15/lb. cost.'

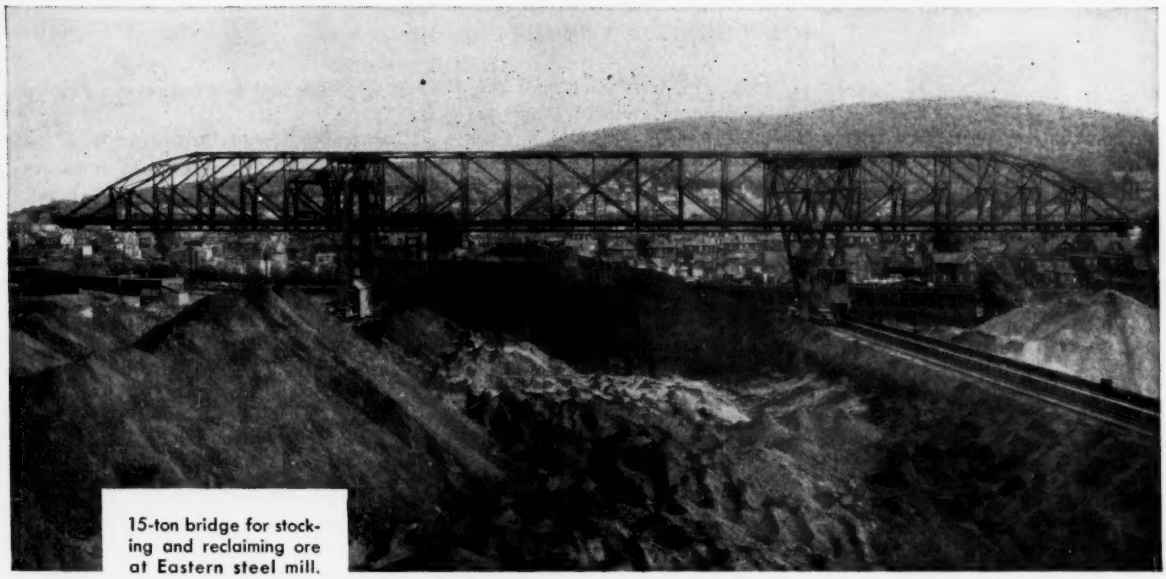
to be substantial. Corrosion control and safety engineering are also important, but are more likely to be accounted for in construction of the facilities.

Key to Costs: AEC's selling price for heavy water—$28/lb.—is proof that the method is economical. In answer to charges that this is an unrealistic price, AEC cites operating costs of just $15/lb. at its Savannah River, S. C., and Dana, Ind., plants. They have been producing heavy water since '52, though Dana has been on stand-by since Dec. '56.

The government's only previous experience with heavy water involved operation of three distillation plants during World War II. Their maximum combined production rate was just 15 tons/year, and operating costs were $110/lb. ($285/lb., including fixed charges).

Although capacity figures are not available for AEC's present facilities, Spevack estimates that the smallest size for an economic plant should be 50 tons/year. He says a private firm could build such a plant for $7.5-10 million and produce heavy water at an operating cost of some 10-20% below AEC's $15 figure. The former standard world price: $109/lb.

Competing Methods: Other methods have received fairly wide study throughout the world, are still being evaluated in foreign plants. The first large-scale facility was the electrolysis works of Norsk Hydro at Rjukan,



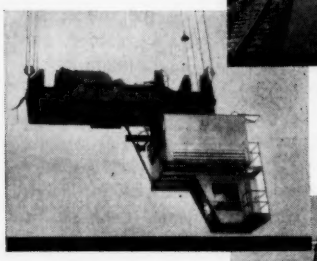
15-ton bridge for stocking and reclaiming ore at Eastern steel mill.

DRAVO heavy materials-handling equipment

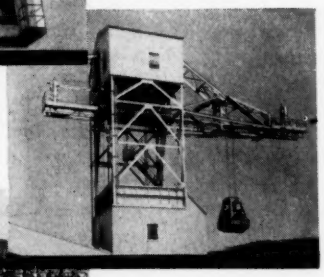
. . . *custom built for you!*

Traveling unloaders built to handle imported ore at an Atlantic port.

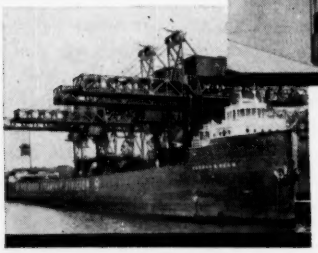
Two bridges for unloading, stocking and reclaiming ore at Great Lakes steel mill.



Light-weight man trolley installation increased bridge handling capacity 60%.



Coal unloader designed and built for a large midwestern electric power company.



Unloading ore boat at Lower Lakes port.

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From actual experience in building and installing the type of equipment shown here, valuable know-how is available in working out features needed in your installation. This knowledge, along with your own operating experience, can be used to create a design incorporating all the best features for easy maintenance, a high safety factor, and simple, economical operation.

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Norway. Destroyed during the war, this plant produced 1.7 tons/year of heavy water as a by-product of hydrogen generation for production of 100,000 tons/year of ammonia. (A cut in ammonia production to 25,000 tons/year would have allowed heavy-water production of 11 tons/year from the same amount of water.) Addition of a deuterium-recovery step (by a nickel-catalyzed H_2-H_2O exchange) allowed a cost of $50/lb. of heavy water produced. A similar process was used at an electrolytic hydrogen plant of Consolidated Mining & Smelting Co. (Trail, B. C., Can.). This plant produced 6.6 tons a year of heavy water at a cost of $60/lb. until the unit was shut down in '55.

A current attempt to revive substantially the same process is being made by Showa Denko, with completion of pilot facilities tieing in with fertilizer production at Kawasaki, Japan (*CW Technology Newsletter, June* 8). Not yet committed, however, the Japanese firm is also studying a dual-temperature process and a hydrogen distillation method.

Hydrogen distillation is receiving a boost from the new Farbwerke Hoechst (Germany) 6-tons/year plant *(CW Technology Newsletter, Aug. 17).* But the cost of D_2O from this plant is said to be in the $100/lb. range, with cuts hoped for. This method was explored pretty thoroughly in the U.S. by Hydrocarbon Research, which was granted a contract to build such a plant in 1949-50. However, even the largest commercial sources of hydrogen can support only 20-40 tons/year of heavy-water production. And despite HR's estimate that heavy water could be made for as little as $16/lb. by this method, hydrogen distillation never got off paper. Nevertheless, National Bureau of Standards is now giving it a try, has a new 60-lbs./year pilot plant at Boulder, Colo.

A recent report on Russian activities indicates that the hydrogen sulfide-water pair is not the only dual-temperature exchange reaction in the running. Not only are the Soviets reported to have a 60-tons/year H_2S-H_2O exchange plant, but they are also said to have an ammonia-hydrogen exchange plant of an estimated 30-40-tons/year capacity. Spevack's patent points out the feasibility of other exchange pairs, but notes that ammonia-hydrogen and hydrogen-water require catalysis.

Heavy Water's Prospects: With the widely spreading interest in construction of nuclear power reactors, heavy water is assuming an ever-greater importance as a nuclear moderator (it is four times as effective for this purpose as graphite). Plentiful sources of economical heavy water would thus be a spur to interest in natural uranium reactors—the type that smaller countries probably will prefer. In fact, the first privately owned U.S. power reactor—the Florida Nuclear Power Group reactor—will use heavy-water-moderated natural uranium fuel.

Since it possesses the same properties, heavy water can be used in place of light water whenever superior moderating qualities are desired. The experimental boiling water reactor at Argonne National Laboratory is a good example, will switch over for heavy-water testing in '58. And heavy water will be the medium used to carry the soluble uranium fuel in aqueous homogeneous reactor systems, such as the Wolverine Electric Cooperative reactor at Hersey, Mich.

Heavy water is already slated for use in some 10-11 power reactors throughout the world (*see table, p. 32*), in addition to more than 20 research reactors. Since 1 to 2 lbs. of heavy water are needed for each kilowatt of electrical capacity, these first power reactors will require about 100-200 tons of heavy water. (Because there is virtually no loss of the moderator during operation of the reactor, the nitial supply may last indefinitely.) AEC sales of heavy water during '56 (at $28/lb.) amounted to $5 million; '57 shipments included 28.5 tons to Sweden and 11 tons to Australia. Clues to the market potential can be found in the Euratom nations' estimate of 15 million kilowatts of nuclear-derived electrical energy by '67 and Britain's 5-6-million-kw. goal by '65.

Product for the Future: Heavy water is potentially useful to fission processes; but its use as a deuterium source makes it a must for fusion—the hoped-for big energy source of the future. Though hydrogen itself can be used as fusion fuel, deuterium requires a much lower reaction temperature.

All things considered, the future of heavy water seems bright. Now it's up to industry to decide when to plunge in.

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7250 N. Cicero Ave., Lincolnwood
Tel.: Ind. 3-7250

Los Angeles 58, California
2930 East 44th Street
Tel.: Ludlow 2-6464

FORMULA:

$(CH_2)_4\ (COOH)_2$

TYPICAL ANALYSIS:

Adipic Acid	99.8%
Ash	5 p.p.m.
Iron	0.5 p.p.m.
Water	0.05%
Color, A.P.H.A.	6

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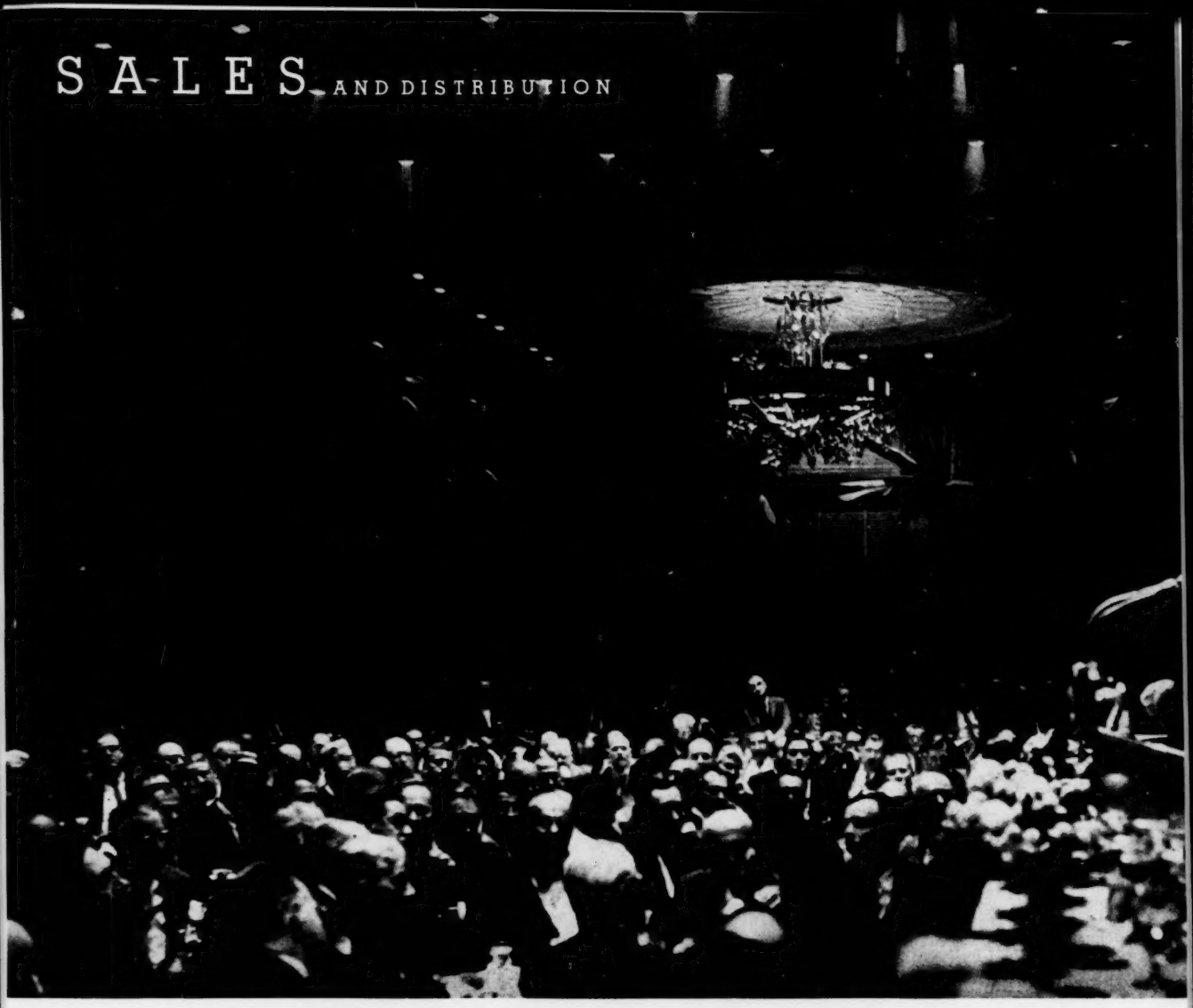


Hushed and attentive, National Industrial Conference Board audience hears Koppers' President Fred Foy

Top Management Ponders a Pricing-Cure for

Before 1,000 top industrialists gathered in New York's Waldorf-Astoria Hotel for the recent Fifth Marketing Conference of the National Industrial Conference Board (*see also p. 68*), Koppers' President Fred C. Foy proposed a bold answer to declining profit rates.

His thesis: pricing-by-plan, or as he terms it, "creative pricing," is needed to prevent reckless price changes, insufficient revenue for industrial progress and growth.

This week, in an exclusive *CW* interview, Foy explores the dangers that conventional pricing holds for chemical business, argues the case for "creative pricing."

Broadly speaking, how do you regard pricing?

Mainly as a venture decision, an attempt to evaluate the "real-use" value of a product to a potential buyer. You also must evaluate other competitive products and what they may be worth to the buyer. Eventually, you make a judgment. Sometimes you're right and sometimes you're wrong; and believe me, there's a lot of venture in it. If venture decisions are "administered pricing" in the eyes of Senator Kefauver, then I'm all for it. Actually, I think "policy pricing" or "creative pricing" is a preferable term.

Hasn't the chemical industry been using venture or "creative pricing" for some time?

Well, it seems to me that there hasn't been as much "creative pricing" as I believe there should be. In some areas, productive capacity has passed the level at which sales can be sustained. There's a great tendency on the part of many companies to try to keep their own capacity going at any cost or level. I contend that this can't be done in an industry that has the plant investment of the chemical industry. It can't demonstrate a truly creative pricing policy until it recognizes that if a market will not sustain

PHOTOS—SYD KARSON

make the case for 'creative' pricing.

Sliding Profits

all of the industry's capacity, it is necessary to sell the output that can be sold at prices that will enable the industry to continue the research, development and investment necessary for growth. Right now, there's too much pricing by accident or, as some economists put it, "price anarchy."

What does "price anarchy" mean to you?

A situation where prices are handled in such a way as to almost wreck the opportunity to operate a sound business in a given area. It's also pricing based on hunches, emotion and misinformation. Sometimes hidden price concessions, such as special freight allowances, unreasonably long credit terms, unrealistic quantity discounts and under-the-table rebates, are part of the picture. Price practices that make exceptions to a company's normal policy are price accidents.

In what areas is the chemical industry "pricing by accident"?

That's not an easy question to answer. But in the plastics industry today, the price behavior over the past year has brought price reductions in some plastics that don't seem to be related to customer or market needs or to production improvement. There isn't any evidence that the reductions have created new or extended markets, and certainly these same price reductions have materially diminished operating margins of all the companies in the field. It seems to me that the managements responsible for the cuts haven't given careful consideration to the reasons for the price reductions and the results arising from them.

What are the dangers in "pricing by accident"?

You can price yourself out of markets, out of growth and out of business—regardless of whether you raise or lower prices. The foremost danger of pricing too high is obvious—you won't sell the product. But pricing too low can prevent getting enough money back for the product to enable you to grow as a business. Products have a life cycle. If the price is too low from the start, you won't accumulate enough revenue to develop the next product, and your business will wither. Your customer loses even more. He will not be getting better products to meet his future needs. "Pricing by accident" can hurt customers in other ways, too. It encourages large and rapid price changes, which disrupt a customer's buying and planning. Opportunistic price cutting reduces a company's ability to pay good wages, finance new equipment and to yield a good return on investment. Opportunistic pricing also goes counter to planned progress and capital spending, destroying the incentive for long-term development and stable growth. "Creative pricing" would help

'You can price yourself out of markets . . . and out of business.'

'Opportunistic pricing destroys a firm's incentive for development.'

'Creative pricing provides the means for progress and growth.'

'Price must be set by weighing the products real-use value to buyers.'

overcome the abuses inherent in "price anarchy."

What are the functions of "creative pricing"?

In my opinion, the most important function is to provide the means for progress and growth. Management must take into consideration the true value of a product to a buyer and the returns needed from the product in order that the company may obsolete and replace the product with a better one. That's the only way industry can continue the growth that people expect and will demand from it in the future.

Are the more traditional functions of price—i.e., price as a means to market a product, recover costs and to provide return on investment—part of a "creative pricing" system?

Oh yes. But they have a very broad meaning in "creative pricing." Consider price as a vehicle to get a product on the market. I don't assume that price is the sole stimulant to demand. The price must be set by considering such factors as the real-use value to the buyer, packaging, ease of application, availability and competing products. These are all competitive factors, and most are more important than price.

The price function of recovering costs is just as broad. Today, for example, it must cover deficiency in depreciation recovery resulting from the erosion of the dollar. The chemical industry now has an annual deficiency in depreciation reserves of $283 million — conservatively estimated. About $590 million of pretax profits, which are not true profits at all, are needed, at the present 52% tax rate, just to replace plants as they wear out, if there is no further inflation.

Is the current chemical price level and its impact on the rate of return on investment related to the decline in chemical stock prices?

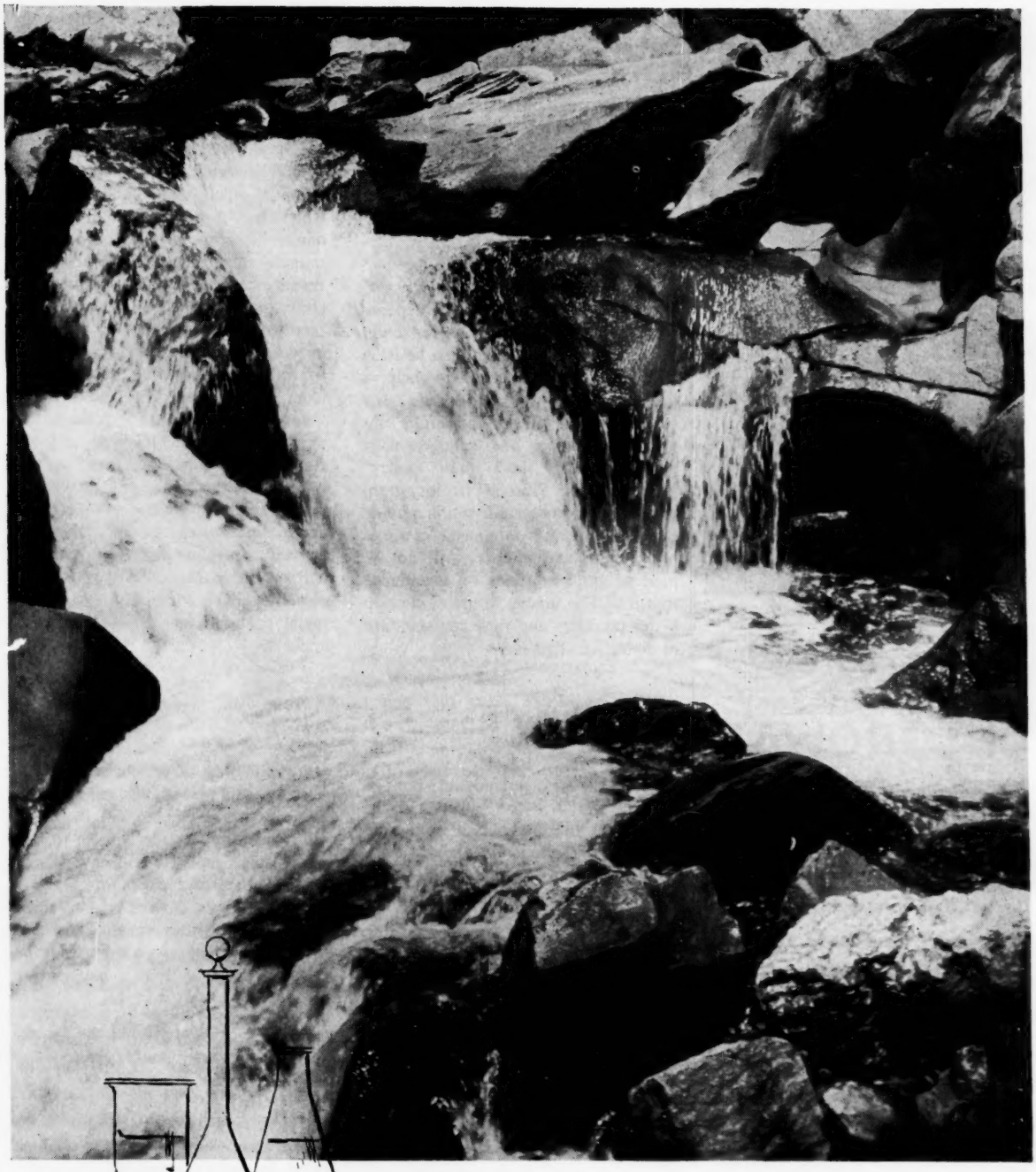
It's hard to say yes, categorically. But some security analysts think so. During the market drop, prices of many chemicals and plastics did fall noticeably. Values of chemical stocks dropped more than those of companies whose prices remained more stable. If the decline continues, the chemical industry will have a tougher time raising outside capital, and it will cost more money.

What comprises a "creative price" policy?

Well, first of all, it is a policy with plan and method to it. Naturally, "price accidents" have no place in such a policy. And "creative pricing" should give weight to the real-use value of products and reflect product qualitites that give the user convenience, service, reliability and other values. As such, the policy would embrace a comprehensive concept of competition and not merely a sterile, "price only" competition. "Creative" pricing also recognizes the twin obligations of a company as both buyer and seller. Purchasing practices should not overstress price at the cost of forcing a retreat from "creative" pricing. That, in the end, could jeopardize the firm's own selling-price policies. A third element in "creative" pricing is an awareness that no company can establish an exclusive domain in price cutting. Competitors will most always take counteraction.

Doesn't such an approach emphasize price stability, or does it indicate price hikes?

Please don't mistake me. I'm all for price reductions when they are



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part of consistent, fair-to-all policy, flow from fundamental improvements in production and serve to increase volume at a fair and reasonable profit level. Otherwise, the "creative-policy" approach emphasizes price stability.

What benefits do "creative pricing" offer?

It will give the buyer price dependability. He will be sure that no competitor is buying cheaper than he is. A consistent price policy will help a company plan for expansion, new product development, research, improved production and better earnings performance. I think that "policy" pricing—firmly rooted in long-term growth—will better serve the public. Buyers won't pay too much in times of scarcity, and industry will not be paid so little in times of abundance that it will be unable to grow, develop better products and raise the standard of living.

What guarantee exists that policy pricing profits will go into growth needs?

It has the strongest possible built-in control, which is the buyer himself. If a price becomes burdensome, he stops buying altogether or, if it's a product he needs, he finds a substitute. You can't sell a buyer something that doesn't represent a useful value. Bituminous coal is a good example. While coal was in declining demand between 1948-54, some companies resisted price wars and concentrated on productivity improvement. Now, despite higher wage and material costs and greatly improved demand, prices are only slightly higher than in '48.

Are purchasing agents accepting "creative" or "policy" pricing?

I think there is a recognition on the part of buyers that more than price is important. Unfortunately, the industrial purchasing agent has an immediate measure of his performance when he can say, "I got it cheaper." That pressure works against acceptance of "policy" pricing. But farsighted buyers realize that it's to their own company's advantage when he purchases from the company that supports forward-looking research and development.

Why is the chemical business making only a limited use of "creative pricing"?

One underlying reason is that pricing is a much more difficult area in which to set a policy than, say, finance. Pricing policies depend on many outside factors over which management has only little control. Other policies—such as finance—are relatively easy to control from the inside. I also suspect that the limited use of "creative pricing" stems in part from surrender to the "free market" theory. It holds that the price has to be the price at which you can sell competitively and, therefore, has the implication that there isn't much use setting policy because you end up doing what your competitor does, anyway. So—defeatism has its effect here as in management's other difficult areas. The antidote is courageous facing-up to the need and the positive approach.

How can "creative pricing" be achieved?

I think it is, in part, a job for the sales department of the selling company. The salesman will have to sell something besides price to the purchasing agent. He will have to talk about service and packaging and research. He will have to mention the secondary advantage that a consistent price policy brings—namely, that no other buyer is getting a better deal.

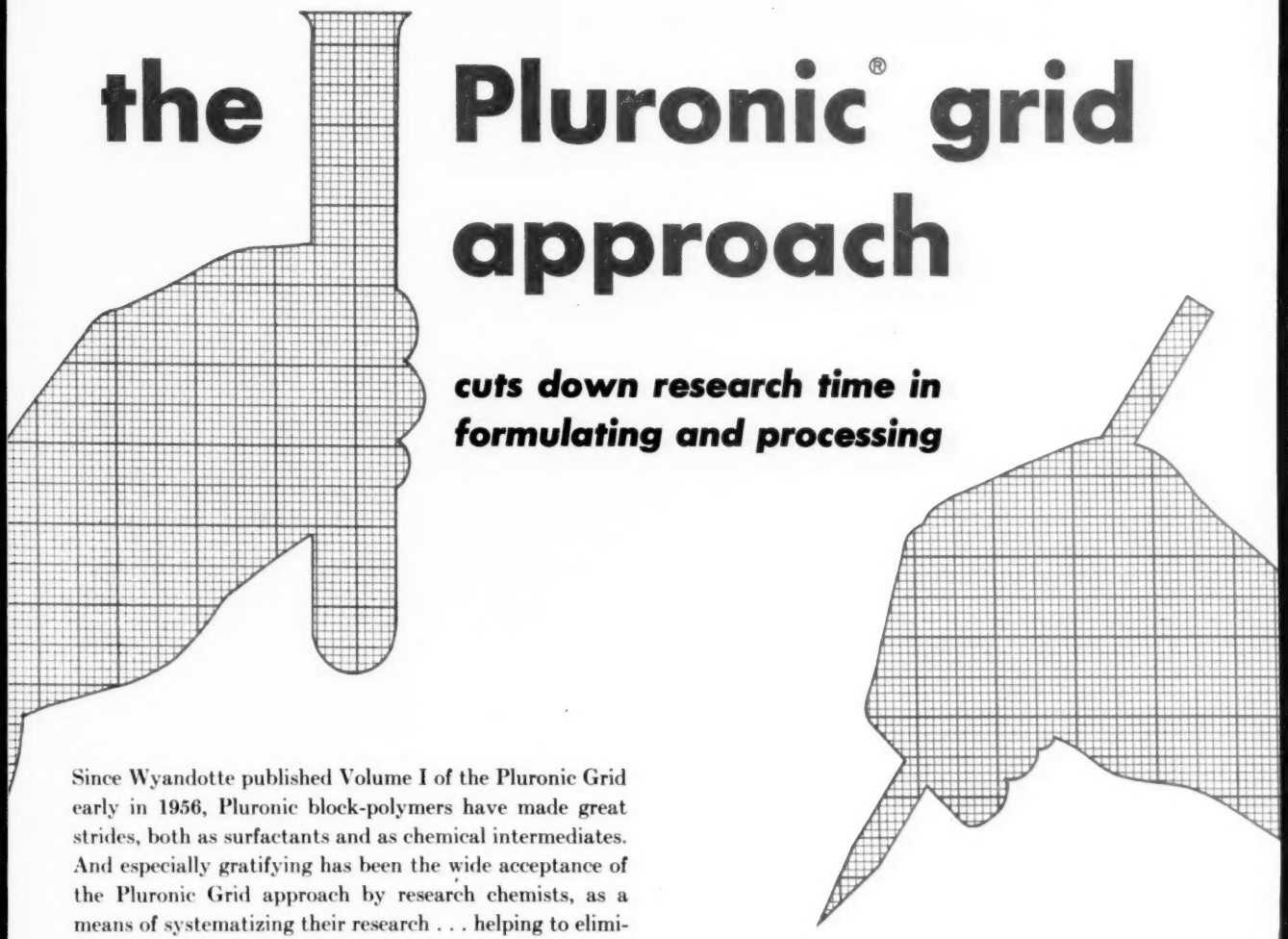
How long might it be before the chemical industry makes widespread use of "creative pricing"?

That's very hard to say. But "creative pricing" has come along well in some industries—especially in automobiles. Their prices include the costs of bringing out new models. And the public appears to be interested in buying new models. Yet, I don't believe anyone would argue that there hasn't been severe and heavy competition in the auto industry.

It would be very difficult for one or two companies in a 10- or 12-company industry to set prices creatively if everybody else was satisfied with price accidents and was concerned mainly with getting business on a "price only" basis.

the Pluronic® grid approach

cuts down research time in formulating and processing



Since Wyandotte published Volume I of the Pluronic Grid early in 1956, Pluronic block-polymers have made great strides, both as surfactants and as chemical intermediates. And especially gratifying has been the wide acceptance of the Pluronic Grid approach by research chemists, as a means of systematizing their research . . . helping to eliminate random evaluation of unrelated surface-active agents.

There are good reasons for this. The Pluronic Grid is not only practical, but easy to use. It simplifies formulation . . . suggests in advance the characteristics you can get using a Pluronic or a combination of Pluronics. More and more laboratories are finding that, by first using the Pluronic Grid approach, they can determine *with just one or two tests* whether or not the Pluronics are applicable. If they are, then a few additional tests will determine the Pluronic, or combination of Pluronics, with the best balance of properties to solve their problem.

In brief, the Pluronic Grid approach offers these advantages:

1. **Provides a controlled, systematic method of screening.**
2. **Minimizes costly random screening by establishing property trends.**
3. **Offers a simple method of determining the effects of changes in molecular weight and in hydrophobic-hydrophilic ratio.**
4. **Helps develop new products and processes, by the accumulation of information on related grades of Pluronics that would have been impossible with random screening of other surface-active agents.**
5. **Permits the chemist to find the Pluronic, or combination of Pluronics, with the best balance of properties for the solution of his problem, instead of trying to formulate to a surfactant's properties.**

When the Pluronic Grid was first conceived, it contained only six members. The number has since been increased to 21. Most of the additions were at the request of major laboratories . . . to help improve the Grid approach. These chemists found that a greater number of grades, with smaller incremental changes, permitted them to obtain a more exact balance of properties with less actual laboratory work. Special grades are constantly being evaluated in highly diversified fields. These new developments make it advantageous for you to keep abreast of the progress in Pluronics' development.

Systematic selection with the Pluronic Grid

Using the Grid, you can select the Pluronic with the exact hydrophobic-hydrophilic ratio and molecular weight to give you the best balance of properties to satisfy your use conditions.

Why the Pluronic series is different

Chemists know that polyoxy*ethylene* compounds are water soluble—no matter how high their molecular weight. For many years, it was generally assumed that polyoxy*propylene* compounds would also be water soluble. However, the fact is: at a molecular weight of about 800-900, polyoxypropylene glycols become essentially water insoluble.

Investigation at Wyandotte revealed that if water-soluble polyoxyethylene groups were added to both ends of the water-insoluble polyoxypropylene chain, a complete series of new block-polymers with highly desirable surface-active properties would develop.

These block-polymers are prepared by adding propylene oxide to the two hydroxyl groups of a propylene glycol nucleus. The resulting hydrophobic base can be made to any controlled length, varying from 800 to many thousands in molecular weight.

By adding ethylene oxide to both ends of this hydrophobic base, it is possible to put polyoxyethylene hydrophilic groups on the ends of the molecule. These hydrophilic groups are controlled in length to constitute anywhere from 10% to 90% of the final molecule. The simplified structure can be represented as:

$$HO\,(CH_2\text{-}CH_2\text{-}O)_a\,\underset{\displaystyle CH_3}{(CH\text{-}CH_2\text{-}O)_b}\,(CH_2\text{-}CH_2\text{-}O)_c\,H$$

Other products on the market can usually vary only the hydrophile. The Pluronics are unique in that the size of *both* the hydrophobe and the hydrophile are variable, offering an additional dimension of freedom. This produces a wider range of properties, which vary in smaller, more controllable increments.

The Pluronics are the only block-polymer surfactants commercially available. They range in physical form from mobile liquids to solids sufficiently hard to be flaked. They are 100% active in all forms, and exhibit a wide variety of surface-active properties. They range in molecular weight from 1000 to over 11,000. They vary from materials that are almost water insoluble to materials that have no cloud point—even at the boiling point of water.

What is the Pluronic Grid?

The Pluronic Grid is a graphic presentation of this broad series, formed by plotting molecular-weight ranges of the hydrophobe against the percent of the hydrophile in the final molecule.

Pluronic nomenclature

To simplify the naming of the Pluronics, they are identified by a letter (L, P, or F) and a two-digit number. The letter identifies the physical form of the particular Pluronic: L for liquid, P for paste, F for flake. The first digit identifies the typical molecular weight of the hydrophobic base, as indicated by the column to the left of the Grid. The second digit suggests the approximate percent of ethylene oxide in the total molecule.

Thus, Pluronic F68 is a flake with a hydrophobic-base molecular weight of approximately 1750; 80% of the molecule, by weight, consists of hydrophilic polyoxyethylene groups, and the remaining 20% is hydrophobic polyoxypropylene groups.

Total molecular weights of the Pluronic grades can be easily computed. For example:

$$\text{Molecular weight of F68} = \frac{1750}{.20} = 8750$$

1750 is the typical molecular weight of the polyoxypropylene base for those Pluronic grades whose first digit is 6. And .20 means that 20% of the molecule, by weight, is polyoxypropylene.

How to use the Pluronic Grid

Because of the wide range of molecular weight obtainable in the Pluronic series—and because of the two degrees of freedom (controlling the molecular weights of both the hydrophobe and the hydrophile)—properties of the Pluronic grades can be plotted as trends across the Grid.

By observing these trends, the formulator can select—from the Grid—those Pluronic grades having the best balance of properties for his particular application. After only a few laboratory tests, he can narrow this area down to the best Pluronic or combination of Pluronics for his formulation.

Known trends for several general properties of the Pluronic series are shown; other specific trends can be determined easily by evaluating a few Pluronic grades from various positions on the Grid. In this way, it is possible for anyone to plot their own trends . . . individual trends directly pertaining to their own operations, conditions, or problems.

Example I:

Formulating a machine-dishwashing compound

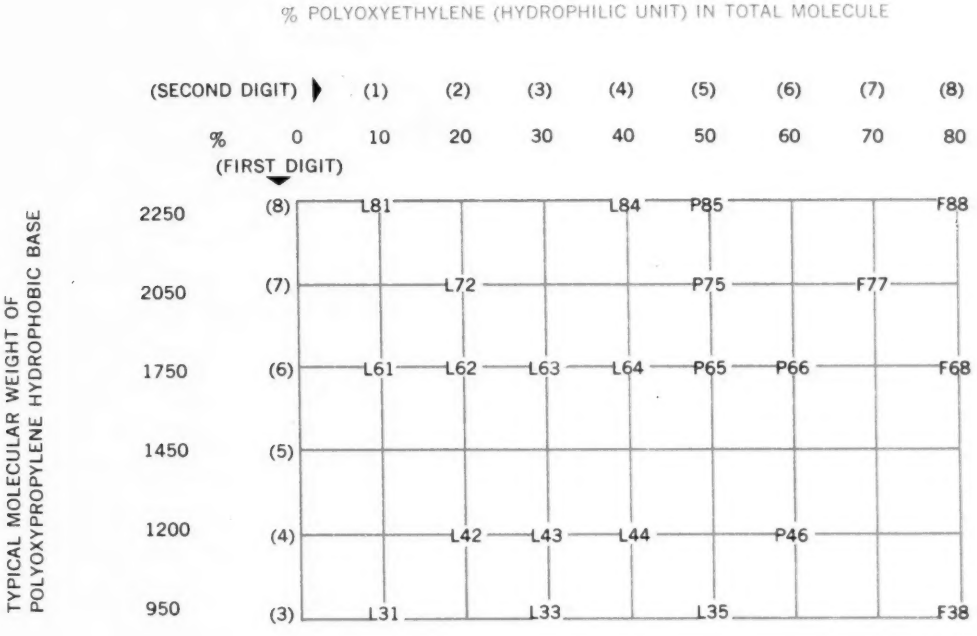
The surface-active agent used in a machine-dishwashing compound should have the following properties: good rinsing; very low foam; good wetting; good detergency; good lime-soap-dispersing ability; good dedusting properties; extremely low toxicity.

Rather than initiate a random evaluation of all the unrelated surface-active agents now commercially available, the formulator can save research time—and direct his efforts in an organized approach to the problem of selecting a suitable surfactant—by referring to the Pluronic Grid.

Very low foam is extremely important in a machine-dishwashing compound. And it can be seen that the lowest foaming Pluronic polymers are in the lower left quadrant of the Grid. The property trends also indicate that the best wetting and penetrating action is in the lower left quadrant . . . this area also has excellent rinsing.

The area of best detergency is in the central portion of the Grid. The best lime-soap-dispersing properties are found in the upper right quadrant. The cloud point and solubility of the Pluronics increase in moving toward the right side of the Grid . . . the formulator may choose a Pluronic having any degree of solubility desired. (*Continued on back page.*)

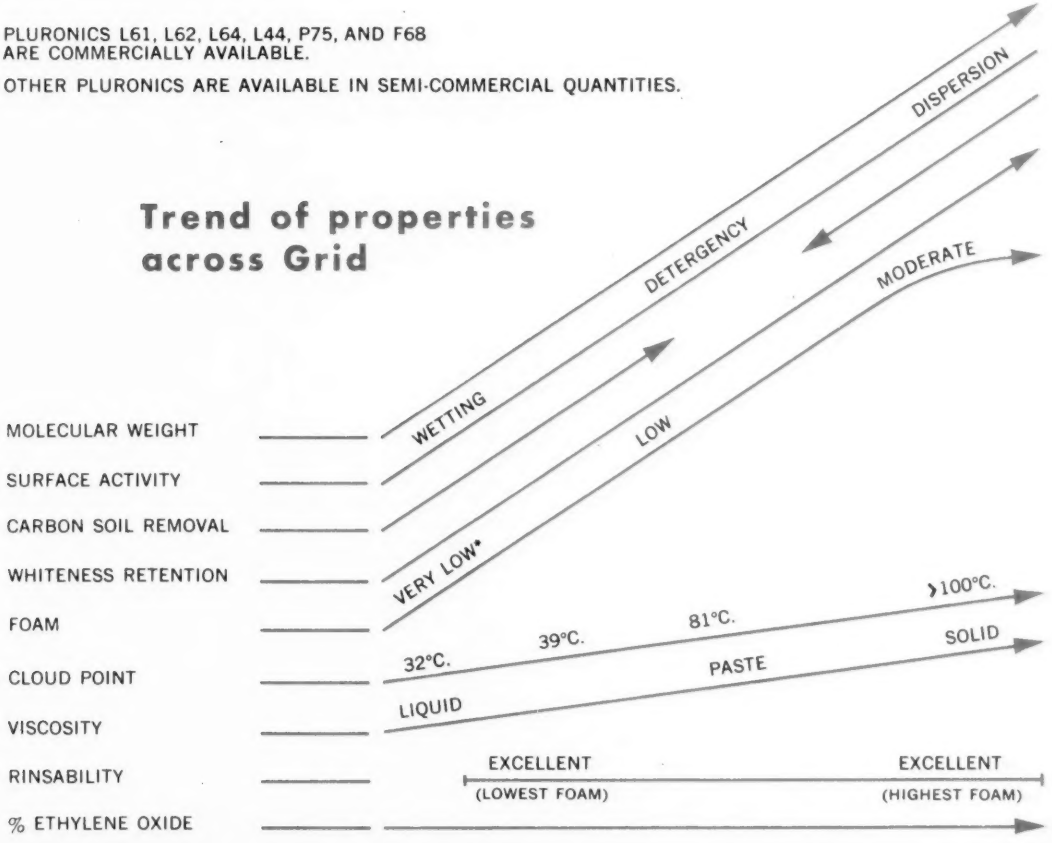
Pluronic Grid



PLURONICS L61, L62, L64, L44, P75, AND F68 ARE COMMERCIALLY AVAILABLE.

OTHER PLURONICS ARE AVAILABLE IN SEMI-COMMERCIAL QUANTITIES.

Trend of properties across Grid



EMULSIFICATION— ALL PLURONICS HAVE FOUND APPLICATIONS AS EMULSIFYING AGENTS.

*ABOUT 10% PLURONIC L61 (BASED ON THE TOTAL WEIGHT OF PLURONIC) EFFECTIVELY REDUCES THE FOAMING OF THE OTHER PLURONICS.

Since rinsing, foaming, and wetting are the most important properties, the formulator should evaluate Pluronic grades L62, L63, L42, and L43 in his particular formulation.* This systematic approach to the problem can eliminate much fruitless work in unprofitable areas.

The same principles have been applied to developing a suitable rinse aid in mechanical dishwashing, where a small amount of surfactant is injected into the last rinse to improve and minimize water spotting and streaking — particularly on glasses, silverware, and plastics. In this application, very low foam, good rinsing, good wetting action, and low toxicity are of primary importance, and this again suggests the area of L62, L63, L42, and L43.

An added advantage of all the Pluronics, not indicated by the Grid, is their extremely low toxicity . . . and liquid grades give permanent dedusting.

It should be noted that L61, L31, and L81 were not considered in this application because of their very low cloud point. However, added in small quantities to any of the other Pluronic grades, they will effectively suppress foam. Field tests have shown that a 1:9 ratio of L61 to L62 or L63 (or any other Pluronic on the Grid) effectively lowers their foam without adversely affecting their other characteristics.

Example II:

Formulating a dispersing agent for hydrophobic pigments

In wetting and dispersing hydrophobic pigments in water, at relatively high solids content, any agent added to aid in dispersion should have the following properties: good dispersing; good wetting; relatively low foam; chemical stability; light color; and the ability to create a hydrophilic surface.

Good dispersion and the most hydrophilic characteristics are found in the upper right quadrant (or high-molecular-weight area) of the Grid. The best wetting and the lowest foam are in the lower left quadrant. Since dispersion and hydrophilic characteristics are the most important properties, and since the foam and the wetting action of the Pluronics in the upper right quadrant are not objectionable, F68 and F88 are the most logical to evaluate.

In actual tests, both of these proved to be very effective in preparing high-solids slurries in water, with F88 being the better of the two. However, when latex binder was added to these slurries, they tended to form gels after extended standing. Further tests revealed that the addition of L81 (the most hydrophobic Pluronic) to the F88 grade made these gels highly fluid again. Later investigation of the area between the two extreme ranges revealed that P85 produced a very satisfactory product that was completely stable at high solids content.

Help from Many Quarters Erased Thamesville's Cyanide Scare

1 From Sarnia, chemical engineer Frank Sundberg, Dow Chemical of Canada, Ltd.

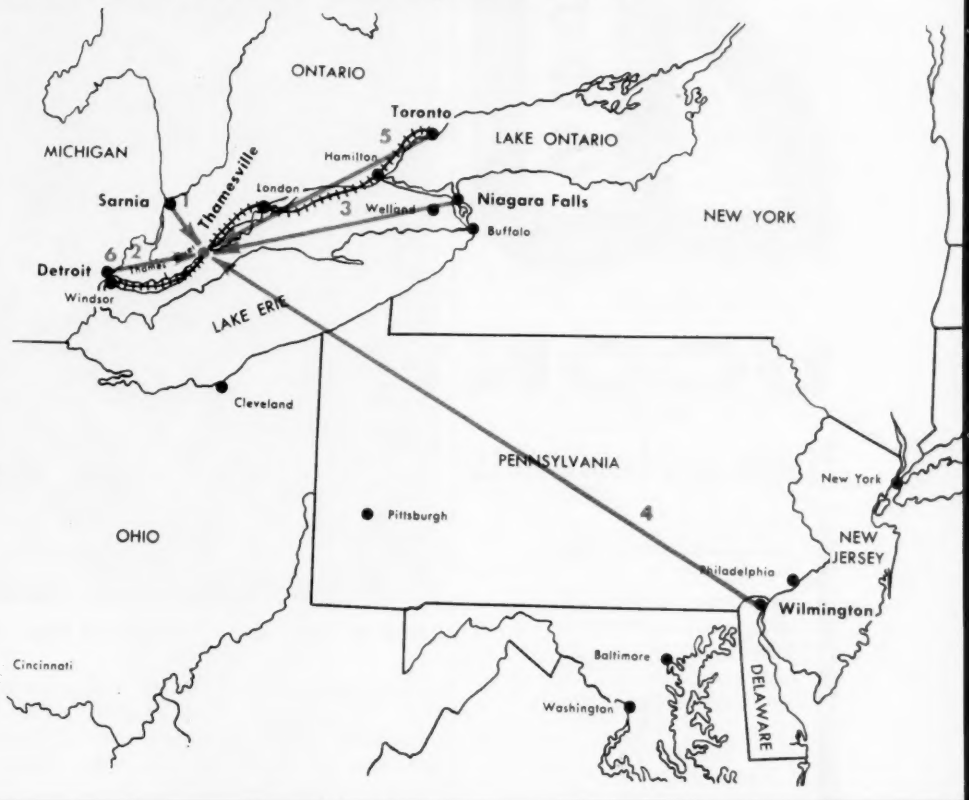
2 From Detroit, chemist-sales representative K. B. Fish, Du Pont.

3 From Niagara Falls, chemical engineers Don Sutherland and Joseph Donahoe, Du Pont (with equipment).

4 From Wilmington and Detroit, public relations representative Harold Brown and regional sales manager Harry Hansen, Du Pont.

5 From Toronto, cyanide antidote kits from Eli Lilly & Co. (Canada).

6 From Detroit, neutralizing chemicals from Nelson Chemical Co. and Eaton Chemical Co.



Triumph of Teamwork in Public Relations

Late on a quiet night the week before last (*CW Business Newsletter, Sept. 28*), the small (pop. 1,100) southwestern Ontario town of Thamesville was awakened by the shattering noise of a fast-moving train barreling into the side of a big trailer truck. When Constable Robert Letts, Thamesville's one-man police force, arrived on the scene of the collision, he found some 20 tons of highly toxic sodium cyanide and copper cyanide littered along the road. What was to be done?

Help was not long in coming. The efforts of several Canadian and U.S. chemical companies quickly erased the public health threat, turned what might have been a black eye for the industry into a public-relations triumph.

Menace in the Mist: Word of the accident quickly spread—and so did the rumors. Thamesville people were scared into their houses by a warning from one confused resident that the cyanide could react with mist or fog to form lethal gas.

With some townspeople holed up in their homes and trying to stuff all the cracks, while other equally misguided neighbors were trying to cover the spilled cyanide with sand, provincial police and civil defense volunteers saw that expert advice was urgently needed. A telephone call to Dow Chemical's plant at nearby Sarnia brought chemical engineer Frank Sundberg to the scene. He pointed out that the principal danger—aside from tasting or touching the spilled pellets and flakes—was that rain might wash the cyanide into local water systems. Authorities then felt warranted in calling off the mass evacuation that had hurriedly been planned.

By this time, Du Pont—whose Niagara Falls plant had produced the materials in the shipment—had been notified. From Du Pont's Detroit sales office came chemist Kenneth Fish with specific advice: clean up the spillage, then wash down the area with "laundry bleach" to oxidize any cyanide left on the ground.

Next to arrive were chemical engineers Don Sutherland and Joseph Donahoe from the Du Pont plant at Niagara Falls, bringing rubber gloves and other equipment. Sutherland—production superintendent of the plant's sodium department—took charge of the cleanup work by local volunteers, and made the decision to bring in "bleach" from two suppliers in Detroit: Nelson Chemical Co., which sent two truckloads of sodium hypochlorite and opened its plant for

WIDE WORLD

Cargo of cyanide was scattered over 400-yard stretch of road.

possible emergency production; and Eaton Chemical Co., which supplied a truckload of calcium hypochlorite. Sutherland promised that Du Pont would guarantee payment for those shipments.

And while Thamesville people were still fearfully supposing that every cough or itching sensation was a symptom of cyanide poisoning, 10 kits for treatment of such poisoning were being rushed in from Toronto headquarters of Eli Lilly & Co. (Canada). Vice-president and general manager, Oscar Funk, said these were offered as a public service, and that more would be supplied if needed.

Public Opinion Considered: At Wilmington, Del., Harold Brown, of Du Pont's public relations department, chartered a plane to Detroit, proceeded (with area sales manager Harry Hansen) the 65 miles to Thamesville by helicopter. Their mission: to see if additional aid was needed, to tell the community how Du Pont had helped to avert the danger, and to make it clear that Du Pont was not at fault for the mishap.

(Both Du Pont and the consignee, the A. T. Wagner warehousing concern in Detroit, have filed claims against Truck Transport Co., of Dearborn, Mich., the carrier; and Truck Transport is expected to file a claim against Canadian National Railways.)

All indications were that the clean-up operation had been successful. By the time the bleach-solution shipments arrived that evening, the spillage had been hauled away and the mass hysteria—as one police official had described it—was over. Sutherland and his associates remained on duty into the night, supervising the laying down of the hypochlorite.

The next morning, with the area apparently clear, they asked county health officers and the Ontario Water Resources Commission to run tests on water samples from nearby wells and from the Thames River. In all cases, the water was free from contamination; but well-testing was to be continued, just to be "supersafe."

But for Du Pont, the dollars-and-cents test of its Thamesville efforts will be whether the citizens of Thamesville ask Canadian authorities to keep U.S. manufacturers from using the southern Ontario shortcut from the Niagara Falls electrochemical complex to the big metal-working industries in and around Detroit.

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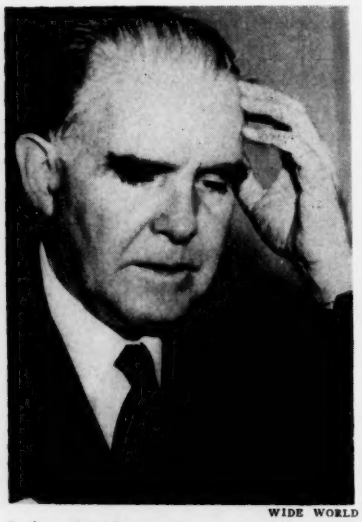

WIDE WORLD

Judge McGarraghy: The U.S. had not agreed to be sued.

Suit for Secrecy

A New Rochelle, N.Y., inventor's attempt to prevent the Atomic Energy Commission from disclosing details of his heavy-water and deuterium process (see p. 31) poses an important question for industry and individual inventors alike: By what means can an inventor protect the secrecy of a discovery used by the government until he secures U.S. and foreign patent protection?

This question is being pursued this week by Jerome Spevack—the inventor whose application for a temporary injunction to block AEC disclosure of his heavy-water process was recently ordered dismissed by U.S. court of appeals for lack of jurisdiction.

Spevack filed for the injunction earlier this year (*CW, May 11, p. 50*), when AEC announced intentions to declassify all heavy-water processes and make them available for public use. Spevack, a chemical engineer, wanted time to file for foreign patents before the process was made public. His application for a U.S. patent—still not granted—was filed in 1950. He holds an earlier patent.

Moot Question: Federal District Judge Joseph McGarraghy heard arguments in private (*CW, June 15, p. 65*), and, in a decision kept secret at the time, denied the injunction on the ground that prior publication made Spevack's claim moot.

The appellate court didn't reach the question of mootness, but held that Judge McGarraghy erred in rejecting the government's contention that the suit was against the U.S. In returning the case to the lower court for dismissal, the appellate court said the U.S. had not agreed to be sued.

During five and a half months of litigation—while AEC was prevented by a court restraining order from disclosing the process—Spevack filed for several foreign patents.

Spevack told *CW* last week that in cutting off the time he needs to seek foreign patents prior to disclosure of the process, AEC would be depriving him of property without due process of law—an individual right guaranteed in the Fifth Amendment.

The inventor has not yet decided on his next step. Two alternatives appear open: (1) to attempt to reopen the case in an effort to gain time to file for additional foreign patents, or (2) to sue AEC, as prescribed by the Atomic Energy Act, for damages resulting from the commission's use of the process.

LEGAL

Pollution Suit Dismissed: Charges of water pollution against officials of Merichem Co. (Houston, Tex.) were ordered dismissed recently when a Harris County justice of the peace agreed with defense attorneys that a jar of dingy, toxic water—major evidence presented by the plaintiff—was dipped from a drainage ditch too far from the stream the water was alleged to have polluted.

Despite testimony that the water caused the death of a dozen laboratory fish in two minutes, Justice of the Peace Walter Queen dismissed charges against Plant Manager Joe Ligon, Plant Superintendent L. J. Jolly, and M. R. Patterson, head operator of the plant for his shift.

Merichem President F. E. Lewis has in the past been specifically charged with his company's pollution violations. (He was fined twice; other charges against him were dismissed.) But court of criminal appeals decisions rendered in two recent Harris County cases held that persons not actually in charge of operations allegedly causing pollution cannot be held responsible (*CW, Aug. 3, p. 36*).

In the more recent case involving

ADMINISTRATION

Merichem, samples of water were taken from a ditch leading from the plant to Green's Bayou a half mile away. Samples showed a pH (alkaline) factor of 10.3.

•

FTC vs. Warsene Capsules: As a result of a recent Federal Trade Commission hearing, Warson Products Corp. (St. Louis, Mo.) has been ordered by FTC to cease advertising that its product Warsene Capsules is an adequate, effective or reliable treatment for the aches, pains or discomforts of any kind of arthritis, rheumatism, neuralgia, neuritis, bursitis or allied disorders.

The concern is also ordered to stop advertising that the product contains any analgesic ingredient other than salicylamide.

IDEAS

Recruiters Turn to TV: Twenty-seven private companies and colleges in the Denver, Colo., area this fall will sponsor a 36-week television series to interest high school students in engineering. Titled "Target: Future," the series will cover a number of fields, including chemical and petroleum engineering and nuclear physics. Among sponsors of the show—to be presented for 2½ hours weekly over the Denver school board's TV channel—are Climax Molybdenum Co., Carter Oil Co., Continental Oil Co., Phillips Petroleum and Shell Oil Co.

•

'Brainstorming' Employee Suggestions: Esso Standard Oil Co. of New York has inaugurated a 12-hour course in creative thinking for employees. Purpose of the course: to stimulate employee contributions to the company's suggestion plan, "Coin Your Ideas." Last year, 3,382 winning suggestions earned employees $139,971.

LABOR

Consolidated Bargaining: A suggestion that employers should unite for greater strength in collective bargaining comes this week from George Romney, president of American Motors Corp. Romney specifically urges a solid front by auto company management; this, he holds, would be the only way to counter "excessive" union demands that could disrupt the national economy through runaway inflation. He questions whether any single company is strong enough to bargain effectively against United Auto Workers (AFL-CIO).

•

Swing to Serenity: A swing toward settlement of labor-management disputes has gained force over the past two weeks. Among recent agreements:

- At Marietta, O., two locals of Oil, Chemical & Atomic Workers (AFL-CIO) have accepted three-year contracts with Union Carbide's Electro Metallurgical Co. division, ending 17- and 21-day strikes. The 1,300 workers are to receive a 12¢/hour across-the-board wage increase and various fringe benefits; and wage reopeners are set for 1958 and '59.
- At Port Neches, Tex., a tentative agreement between a 260-man OCAW local and Texas-U.S. Chemical Co. appeared to presage the end of the six-union work stoppage that had idled the plant since June 10.
- A 12-week walkout at Pure Oil Co.'s Lemont, Ill., refinery is being ended by another OCAW local. The 450 employees are getting a 6% wage increase and other benefits, and the company has agreed to drop its $933,621 damage suit against the union.
- At Niagara Falls, N.Y., rank-and-file members of the independent Niagara Plant Employees Union have accepted Du Pont's offer of a 6¢/hour wage rise, despite a recommendation

WIDE WORLD

Auto-Maker Romney: Employers, too, should unite for strength.

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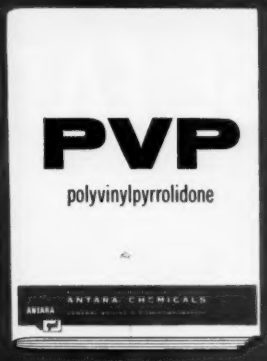

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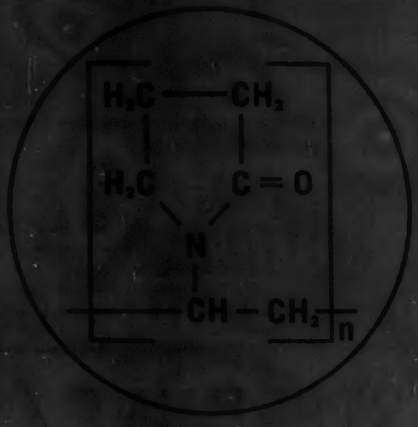

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CW-1057

ADMINISTRATION

by the union's negotiating committee that the offer be rejected. But at the same time, the membership directed the bargaining committee to keep trying to get the 14¢ increase that has been the committee's goal.

• At Buffalo, N. Y., leaders of the District 50 local, United Mine Workers, got their members to return to work after a two-day strike at Allied Chemical's National Aniline Division plant. Bones of contention: transfer of certain salaried employees to hourly paid status with accumulative seniority; and a proposed increase in plant cafeteria prices.

KEY CHANGES

R.S. Rydell, to vice-president for chemical products, Smith Douglass Co. (Norfolk, Va.).

William H. Bowman, to general manager; and **Neil B. Conley,** to assistant general manager; Organic Chemicals Division; and **V.E. Atkins,** to general manager, Manufacturing Services Division; all of American Cyanamid Co. (New York).

E.M. Goldstein, to manager, metallurgical laboratory (Rahway, N.J.), Metal & Thermit Corp. (New York).

Albert H. Cooper, to general manager, American Industrial Chemical Co. (Butler, N.J.), a division of Amerace Corp. (New York).

Edwin I. Stoltz, to technical director in charge of research and development, Adell Chemical Co. (Holyoke, Mass.).

Alfred J. Dickinson, to vice-president for sales, Freeport Sulphur Co. (New York).

KUDOS

To **Fred D. De Vaney**, chief metallurgist, Picklands Mather & Co. (Duluth, Minn.), the Robert H. Richards Award, of the American Institute of Mining, Metallurgical and Petroleum Engineers.

DIED

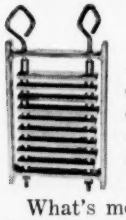
Joseph L. Plowright, 60, director and vice-president in charge of sales, Sapolin Paints (New York), at Douglaston, Queens, N.Y.

L.W. Wasum, president, Kessler Chemical Co. (Philadelphia).

Here's a crystal ball

that accurately predicts metal performance at high temperatures:

Inco's in-plant test rack program



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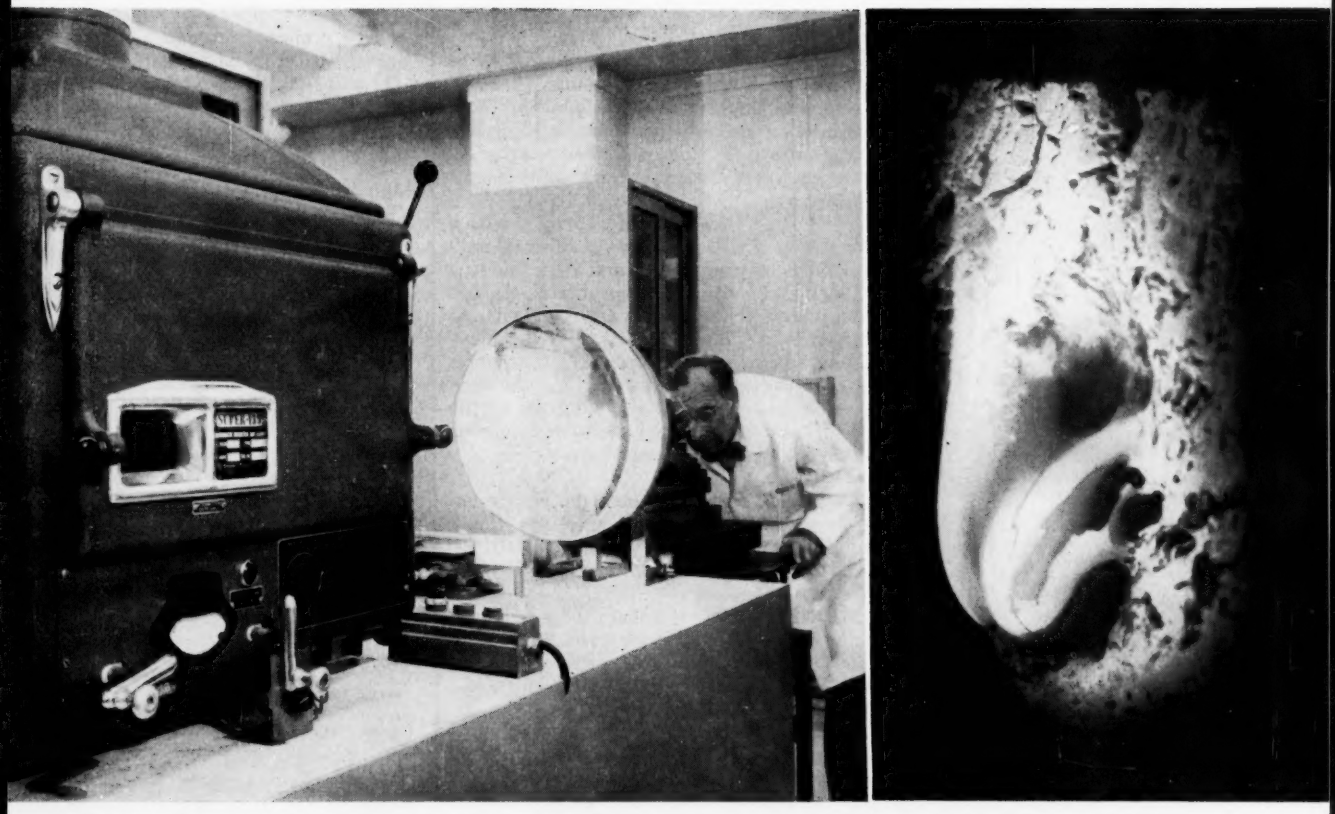


Technician focuses microscope on melting firebrick in new furnace; what he sees is shown at right.

Sun-Hot Furnace Seeks Production Jobs

A new furnace, developed at National Carbon's (Parma, O.) research labs, may prove to be a valuable core around which to build high-temperature chemical or metallurgical processes. That's the belief of R. G. Breckenridge, the firm's laboratory director, who unveiled the device this week.

Like Arthur D. Little's modified searchlight furnace (*CW, Feb. 9, p. 88*), the new device generates sun-surface temperatures indoors, using a carbon arc as a light source. Instead of a large parabolic reflector, however, the latest "arc image" furnace utilizes two 18-in.-diameter elliptical mirrors, 6 ft. apart, to focus the arc's energy onto the substance to be heated. This feature makes the furnace compact and portable.

In addition, a shutter can be placed midway between the mirrors, so that energy can quickly be turned on or off without disturbing the arc. Or a tilted mirror can be placed at the same point to tip the beam to any desired angle.

The mirrors are standard types used in motion picture projection equipment. High-cost, specially designed mirrors used in solar furnaces aren't necessary. In the furnace (*above, left*), arc carbons less than ½ in. in diameter, drawing 200 amps. and operating at 80 volts, produce furnace temperatures above 7000 F. That's hot enough to melt fire brick (*above, right*) and sufficiently high for many high-temperature studies.

In comparison, ADL's furnace will reportedly develop 6000 C (with a heat flux about that obtained with sunlight). National Carbon, however, sees no reason why its arc-image furnace can't be made with larger arcs, using higher power to yield more heat. It is already working in this direction.

All solar-type furnaces, of course, have an advantage over conventional heat sources in being able to raise research samples to high temperatures uncomplicated by contamination from flames, containers, or magnetic fields. The arc-image variety is especially useful for research, because it can be used indoors, is independent of darkness or unfavorable climatic conditions.

Instruments, such as a mass spectrometer, may also be attached. At National Carbon, researchers use a

high-temperature microscope to see what is happening to the heated materials under study. And the beam can be projected through a transparent window into an enclosed vessel, where both temperature and pressure can be controlled.

Such features, believes Breckenridge, make the new furnace a "very valuable research tool [that] might well become a useful production tool as high-temperature operations become more common."

Meanwhile, arc-image furnaces of any variety will find plenty of specialized research problems to help solve. Because of the unique nature of this heat source, it is particularly fitted for precise studies of such still-to-be-explored matters as the solution of gases in molten metals, and chemical reactions in fused salts.

Petrochemical Lab

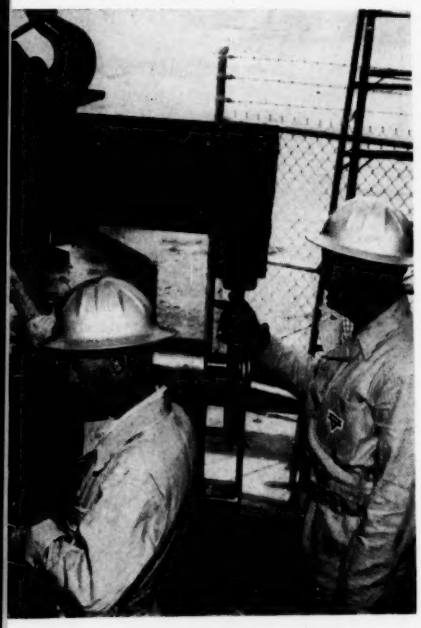
Continental Oil Co.'s new radiation lab in Ponca City, Okla., is one of the nation's first to use reactor fuel elements as a radiation source. The uranium-containing rods are shown arriving in a protective 13-ton lead casket from AEC's atomic reactors at Arco, Ida. They yield gamma rays mainly, are intended for research in improved petroleum and petrochem-

Antibiotic Advances

The newest antibiotic research was aired this week at the Fifth Annual Symposium on Antibiotics* in Washington, D.C. Some of the news wasn't so good. Keynoter Henry Welch, director of the Food & Drug Administration's division of antibiotics, called particular attention to FDA's recently completed 3,419-case survey of severe reactions to antibiotics. Welch revealed that the great bulk of reported reactions followed administration of penicillin and that severe penicillin reactions have become more frequent during the past few years.

Over-all, however, the meeting was optimistic. Highlights included reports

*Sponsored by the Food & Drug Administration in collaboration with the journals *Antibiotics and Chemotherapy* and *Antibiotic Medicine and Clinical Therapy*.



Fuels for Research

ical products and processes. After four to six months, the rods will have lost about three-fourths of their energy. When not in use, the rods are stored at the bottom of an 18-ft. well containing 19,500 gal. of demineralized water, constantly purified by a recirculation system. For use, the rods are elevated to a hot cell by remote control.

RESEARCH

on both new antibiotics and new antibiotic uses.

Lymphotrophic antibiotics, turned up by P. Malek and his colleagues, of Czechoslovakia's Institutes for Clinical and Experimental Surgery and for Antibiotic Research (Prague), captured special interest. Malek reasons that since the lymphatic system is especially vulnerable to bacterial invasion, a way should be found to get antibiotics in high concentration into the lymph nodes. Malek found this can be achieved with salts formed by reaction of basic antibiotics (e.g., streptomycin or neomycin) with polyacrylic acids or certain natural polycarboxyl acids, sulfonated or phosphorylated polysaccharides. He terms these macromolecular salts "antibiolymphins."

Among the new antibiotics described at the meeting are telomycin (Bristol Labs), pimaricin (Royal Dutch Yeast and Fermentation Industries, Delft, Holland), and sulfocidin (J. T. Baker Chemical Co.). All are in the early stages of research. None appears to hold great promise at this point.

EXPANSION

- Sun Oil Co. will dedicate its new $2.5-million research and development building at Marcus Hook, Pa., on Oct. 15.
- Procter & Gamble of Canada will spend nearly $750,000 to expand its two-year-old Hamilton, Ont., product research and development laboratories.
- Goodyear Tire & Rubber Co. (Akron, O.) is setting up a new products department to explore diversification possibilities. It plans to spend $1 million on the effort in the coming year. Director of the new department is M. J. De France, formerly manager of Goodyear's chemical products materials-development program.

APPARATUS

Fat Finder: Eastman Chemical Products (Kingsport, Tenn.) will supply details of a new test method it has developed for determining the oxidation stability of fats and oils and foods containing them. Eastman's test — based on a modification of the standard ASTM oxygen bomb method of comparing gasoline stabilities—is said to be more precise than previous methods.

Technology
Newsletter

CHEMICAL WEEK
October 5, 1957

Plans to adapt plutonium into the generation of nuclear power were described in detail last week by Paul Murray, technical specialist at GE's Hanford Laboratories (Richland, Wash.). A test reactor—the Hanford PRP—soon to be built at Richland, will employ plutonium-enriched uranium fuel suspended in a tank of heavy-water moderator. The system will generate 186,000 lbs./hour of steam, part of which will be used to provide electricity for operation of the reactor.

Plutonium, formerly limited to weapons applications, will serve the same purpose that U-235 does in conventional enriched nuclear fuels. Moreover, since plutonium is produced as a fission by-product, it should be an attractive alternate to U-235 in small countries that can't afford the expensive gaseous diffusion plants required for uranium isotope separation. AEC's set price for plutonium produced in licensed power and research reactors: $30-45/gram (depending on Pu-240 content) for purchases between Feb. 1, '57, and July 1, '62; thereafter, $30/gram until June 30, '63.

Additional investigations into the peaceful uses of plutonium are continuing at Oak Ridge National Laboratory and Los Alamos Scientific Laboratory. A major effort at the latter location has been the development of tantalum equipment capable of withstanding the corrosion of molten plutonium fuel.

•

Carbide's peracetic acid process is better understood this week as a result of the issuing of a patent on it (U.S. 2,804,473). As the firm explained earlier (*CW, April 14, '56, p. 92*), the first step is the oxidation of acetaldehyde to acetaldehyde monoperacetate. The AMP is then decomposed into peracetic acid and acetaldehyde. The trick: controlling the decomposition and keeping the two products from reacting with each other.

In its patent, Carbide explains several ways of doing this. One preferred way is to dissolve it, then crack it catalytically. The vapors are then sent through a dephlegmator, where the peracetic acid and solvent are condensed while the acetaldehyde and any other low-boiling material pass through.

•

A chemical way to make battery-grade manganese dioxide will challenge the conventional electrolytic method. American Potash, which developed the process, is building a pilot plant at its Henderson, Nev., facilities, that's expected to start up toward the end of this year.

The key reaction in the process involves the reaction between manganese sulfate and sodium chlorate. The two compounds, in aqueous solutions, are fed from separate streams into a glassed-steel reactor containing dilute sulfuric acid. Chlorine dioxide, given off as a by-product, is absorbed in caustic and recycled. Patents have been applied for.

American Potash sees the process as one that will free the country from dependence on foreign sources of manganese. In addition, the firm expects the product will be able to compete favorably with electrolytic dioxide, which now sells for 30¢/lb. Tests by the firm and by the Signal Corps indicate that the product of the process has "high battery quality."

•

Lithium is the key additive in a new aluminum alloy (X2020) developed by Alcoa. It will maintain its strength up to 400 F, about 100 F higher than other aluminum materials. Because of the high temperatures developed on the "skin" of high-speed aircraft, stainless steel or titanium must be used on a craft traveling faster than 1,300 miles/hour. The new alloy, Alcoa feels, will enable the use of the lighter aluminum metal on planes developing air speeds of up to 1,600 or more.

•

The Fischer-Tropsch process may be more economical now for manufacture of gasoline from coal in Britain than it has ever been, says Britain's Fuel Research Board in its annual report. The report cites improvements in synthesis gas manufacture, and points out that a catalyst suspended in molten wax through which gas is bubbled may eventually bring about a cheaper synthesis.

Further, the board states that the use of atomic energy to generate electric power in that country may have freed enough coal by the end of the decade to provide more incentive for making oil from coal.

•

Maleic hydrazide has proved capable of halting potato sprouting in just-completed tests at the University of California. It apparently doesn't cause any change in the potato. However, a treated tuber can't be used as a seed stock for another crop. University researchers report they couldn't "break the dormancy imposed even with giberellic acid, a potent sprouting stimulant."

•

A protective coating that can be applied on top of rust? That's what Otto Loewe, a German chemical manufacturer in Elmshorn, near Hamburg, claims. The surface to be coated is first given a rough cleaning. Then two coats of the new paint, Corrolit, are put on. Then a third colored coat (or a fourth, for ship bodies) is painted or sprayed on. The covering has reportedly proved itself under extensive testing at a government materials-testing lab in Darmstadt.

•

A million gallons of fresh water will be extracted from the sea each day to supply feed water for the Bahamas Electric Corp.'s abuilding Slifton Pier power station. G. and J. Weir, Ltd. (Glasgow, Scotland) received an order to furnish evaporation and distillation units. The same firm supplied similar units for Kuwait in the Persian Gulf, Curaçao and Aruba in the Netherlands Antilles, and Lobitos in Peru.

To assure customers a product of highest possible quality, Hercules runs exhaustive tests on each batch of meta Delphene, outstanding new insect repellent, now produced at the Brunswick, Georgia, plant.

ANOTHER EXAMPLE OF HERCULES EMPHASIS ON QUALITY

The production of meta Delphene, Hercules Powder Company's diethyl m-toluamide, presented a challenging problem in the isolation of the product in the purity required of a cosmetic chemical. In solving this problem, Hercules drew on its long background in xylene oxidation to produce a material of uniformly high meta isomer content, free from color, odor, or irritating contaminants.

Now, in the first year of consumer use in the United States and Canada, enthusiastic reports confirm the results of the extensive laboratory and field tests. Meta Delphene provides excellent protection from insect pests, has shown no irritation on either intact or abraded skin.

Hercules anticipates that recent expansion of plant facilities at Brunswick, Georgia will assure an adequate supply of the same high quality meta Delphene for the 1958 season.

meta DELPHENE
HERCULES TRADEMARK
83 per cent minimum meta isomer

Agricultural Chemicals Division, Naval Stores Department
HERCULES POWDER COMPANY
INCORPORATED
900 Market St., Wilmington 99, Del.

ND57-2

Olin Mathieson's Logan: 'Chemical and allied products sales outlook for '58 is good; expect a 5% increase.'

Du Pont's Shaw: 'Textile headaches are easing; industry next year should pick up 2-5% over '57.'

Hercules Powder's Mayfield: 'Chemical industry's annual 7%/year growth rate may continue.'

For '58 a Light Tinge of Optimism

For most segments of the U.S. economy, including chemical and related industries, the market outlook is lightly tinged with optimism: business, generally, will improve; there's no boom or bust in sight.

That, in essence, was the consensus of industry leaders, who presented their views a few days ago on what's ahead for chemicals, oil, nonferrous metals, textiles, and other industries at the fifth annual marketing conference of the National Industrial Conference Board in New York's Waldorf-Astoria Hotel.

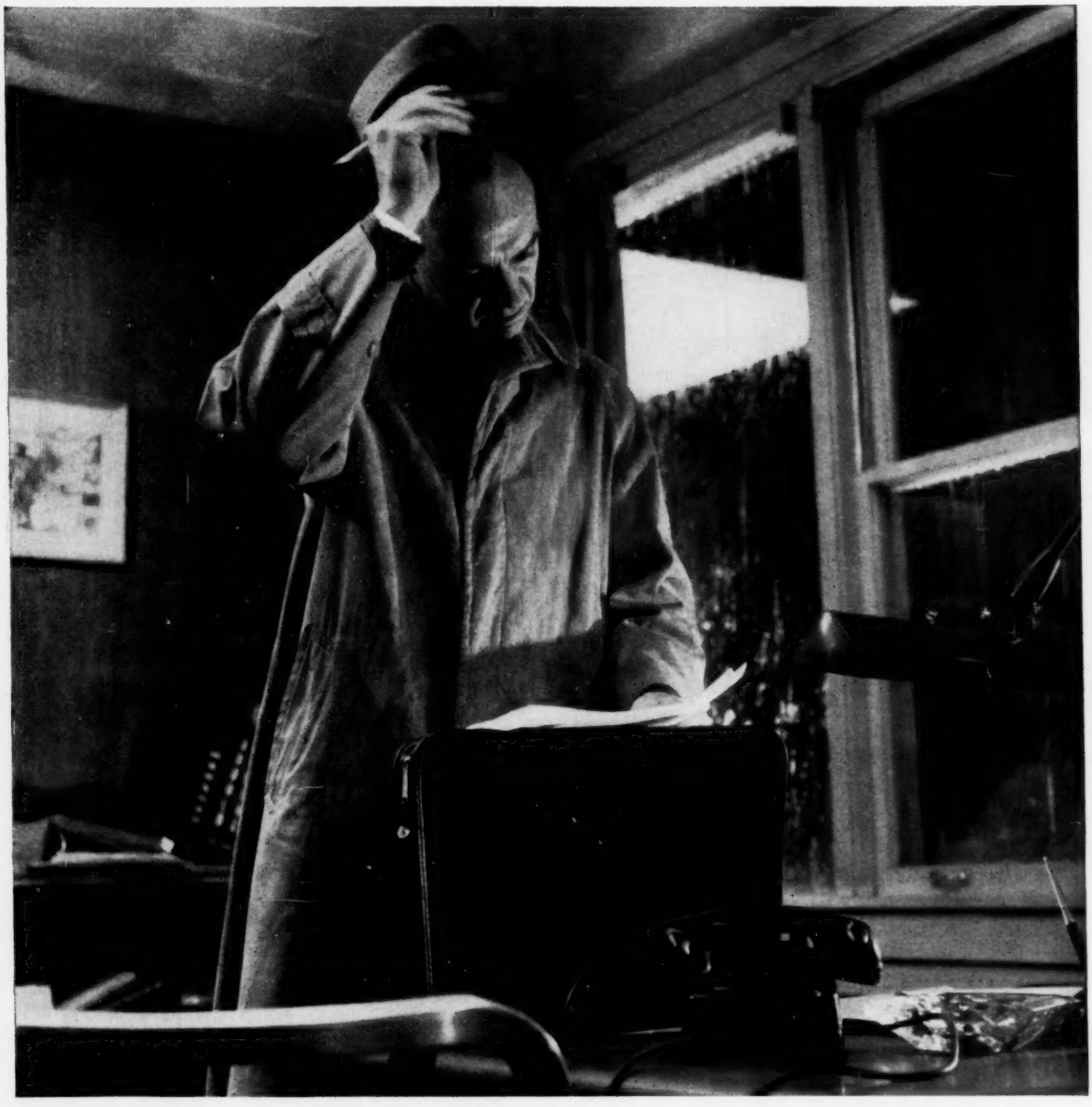
Earlier sessions of the three-day meeting spelled out methods of improving sales organizations, developing better market coverage, and ways of cutting marketing costs. In addition to the marketing sessions, the conference provided a close look at prospects for sales in '58 and as far ahead as '61.

Higher for Chemicals: Chemical sales in '57 may hit $25 billion, 9% above '56 sales, "if industry expectations are met during the second half." The projection was made by John Logan, vice-president and general manager of Olin Mathieson's Industrial Chemicals Division, who further predicted a 5% dollar sales rise for chemicals and allied products next year.

"The prospect for an extension of the upward trend into '58 is good," Logan told the conferees at the session on "Sales Outlook for 1958," but noted that the anticipated increase was nowhere near the "sensational" 18% jump from '54 to '55.

He cited five reasons for his '58 sales forecast:

• Certain industries, which have slumped in the past year or so, show



Tough salesman to outsell

(Quality of Dow substituted phenols gives him an advantage)

Dow salesmen are enthusiastic when it comes to making a sale. But often they express their enthusiasm in patient conviction.

"The customer knows his business best," they reflect, "and his judgment of a product is second to none. That's why we let any of our substituted phenols (Bisphenol A, for instance) speak for itself. Test it!" our salesmen encourage. Good strategy! For, time and time again, testing results in buying! Quality makes the difference . . . not only to our salesmen but, more so, to the growing number of manufacturers who gain more uniform processing and improved products. It's Dow quality—a consistent ingredient you can depend on at no extra cost. THE DOW CHEMICAL COMPANY, Midland, Michigan, Dept. BD 836A-1.

YOU CAN DEPEND ON DOW

some signs of a moderate recovery in '58.

- General business appears headed for a plateau in '58.
- Customer inventories of chemicals and allied products are currently at a low level.
- The chemical industry's record capital expenditures of the past two years should be a stimulus to sales and to the development of new markets.
- An increase in chemical prices that will contribute to higher dollar income is anticipated in '58.

Explaining his prediction of higher prices, Logan pointed out that chemical selling prices have not kept pace with rising costs nor with prices in other fields. In June, the last month for which figures are available, wholesale chemical prices were only 9% above the 1947-49 average, he said, compared with 17% for all manufactured goods prices. How has this affected the industry? Profit margins of the eight largest chemical companies, said Logan, declined 10.5% in '56, were down an additional 14% in the first half of '57.

In the session on "The Midterm Sales Outlook—1959-61," Paul Mayfield, vice-president of Hercules Powder, charted the trend-line rate of growth of chemicals and allied products. Such growth, he said, is about 7%/year, or almost double that of total industrial production. He cited the impressive amounts spent on chemical research and development (currently more than $400 million a year) as the chief reason for the industry's high postwar growth rate.

With this "favorable past performance in mind," Mayfield, via a series of slides, sketched out his forecast. "Assuming a peacetime economy with normal levels of production and average levels of unemployment," he expects that the industry's annual 7% growth rate will continue through '61.

Projections of basic inorganic and industrial organic chemicals production indicate that although some old-line products may slip, introduction and expansion of markets for new items will continue to sustain an overall growth. Output of each of the basic groups of chemicals in '61, believes Mayfield, will be more than double the production rates in '52 and about 50% above those in '56.

Nonferrous Metals: Next year, supply of nonferrous metals should be adequately available and at more stabilized prices. Even before then, probably by the end of '57, there should be a finer balance between supply and demand. This, said Joseph Zimmerman, editor-in-chief of the *Daily Metal Reporter*, will be "partly the result of an increase in consumption and partly because of the curtailment in output of copper, lead and zinc that is taking place."

Zimmerman laid much of the blame for the current unsettled status of nonferrous metals on recent government moves. About copper, for example, he said that the U.S., "fearing a shortage of long duration," encouraged domestic and foreign mining companies (via financial loans and floor price contracts) to open new properties and to expand production of old ones.

This encouragement, coupled with the high prices prevailing during '55 and '56, "stimulated production at home and abroad so that it outstripped consumption," and resulted in producers' surplus stocks climbing to their highest level in eight years.

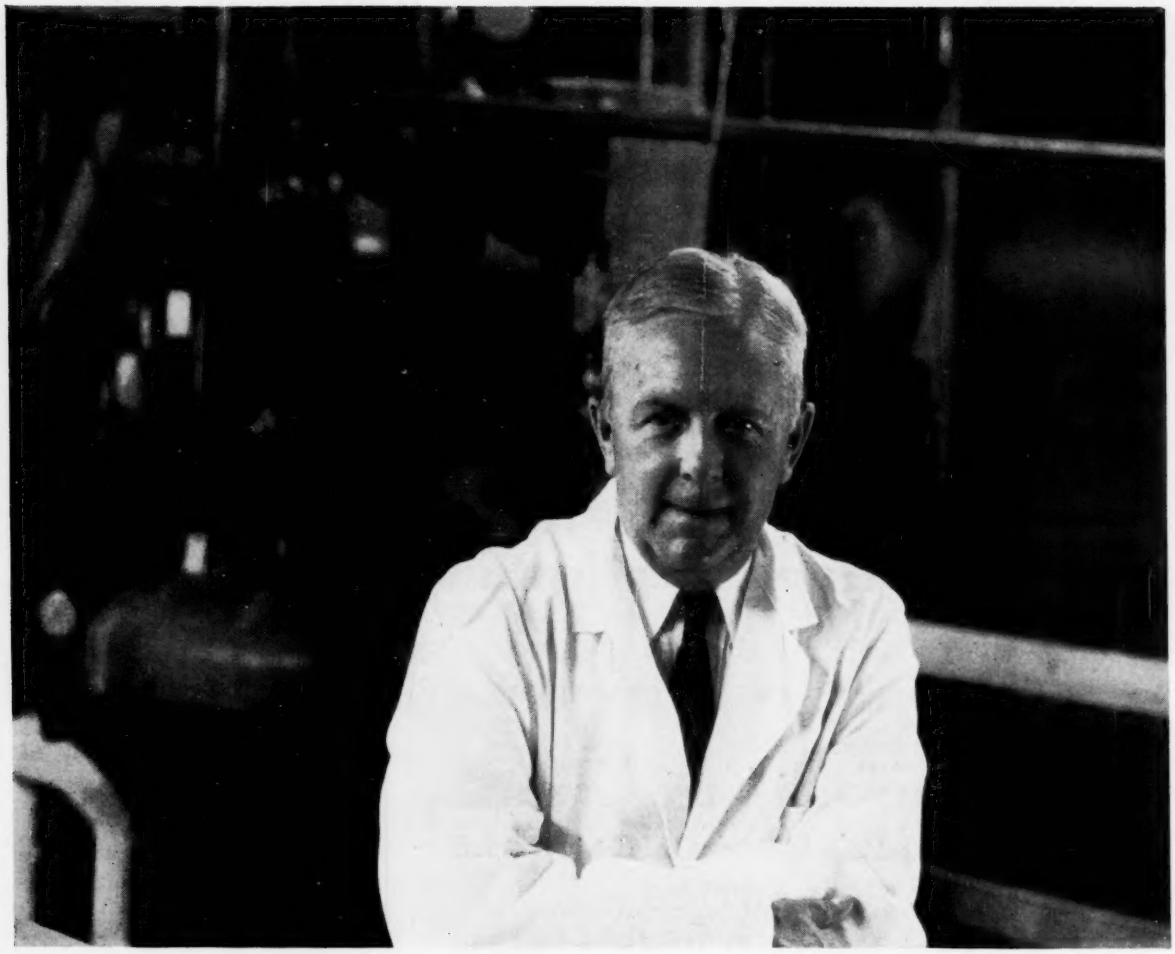
Highlight of the metals talk by Charles Winship, Jr., Phelps Dodge general sales manager, was his estimate of consumption in '60. Winship chose that year to reflect an average for the "midterm" period. Use of newly mined copper, he believes, will hit 3.6-4 million tons; lead, 2.1-2.3 million tons; zinc, 2.5-2.7 million tons.

Further, said the metals expert, the Western nations' "capacity to produce these metals will be translated into sufficient actual production to meet such consumption requirements."

Winship also climbed out on a thin limb to predict probable price levels for the 1959-61 period. Making metals price predictions is difficult, he said, explaining that too many non-economic factors are involved that have had decided effects on prices, even in peacetime. Examples: government purchases, direct or through barter programs by the U.S., sales by government agencies outside the U.S., import and export restrictions.

Nonetheless, here's how he pegs future metal tags: copper, in the range of 30-35¢/lb.; lead, 15-17¢/lb.; zinc, 13-15¢/lb.

Tougher for Textiles: "Of the eight industries [whose '58 prospects were discussed in one session], the textiles industry has the unhappy distinction of



This man runs the only glycol dimethyl ether plant in U.S.

Clayton Parcels is in charge of Ansul's glycol dimethyl ether plant, the only one in the United States. His plant is running at full capacity because these unique solvents are playing a vital role in many new chemical processes.

Take the exciting things being done with metal hydrides, for instance. Sodium borohydride required a non-reactive solvent, so Ansul Ether 141 (dimethyl ether of diethylene glycol) was suggested. Now sodium borohydride can be used effectively as a reducing agent for aldehydes, ketones, acid chlorides, acid anhydrides—and most recently—in ester reductions.

Mr. Parcels would like to send you our new 27-page technical bulletin on the solubility and stability of commercially available hydrides in Ansul glycol dimethyl ethers. For that matter, he'd be happy to talk with you about any chemical problems that might require a specialized solvent. Write Clayton Parcels, ANSUL CHEMICAL COMPANY, MARINETTE, WISCONSIN.

ANSUL

INDUSTRIAL CHEMICALS • FIRE FIGHTING EQUIPMENT • REFRIGERATION PRODUCTS

being the only one that has largely escaped the great prosperity of the past few years." Thus did William Shaw, business economist for Du Pont's textile fibers department, set the tenor underlining his forecast of a moderate improvement in the industry's outlook.

Some of the "real and persistent headaches" that have plagued textiles are well known, he said; they include clothing's declining share of the consumer dollar, excess spindle and loom capacity, periodic inventory gluts, chaotic pricing, competition from cheap imports, and inadequate market analysis.

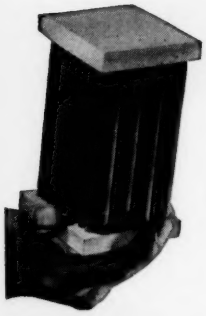
But the partial solution of some of these problems during this year and last will have a decidedly "plus influence" on textile prospects in the months ahead, he said. For one, the import threat has been at least temporarily lessened. The Japanese are apparently honoring voluntary quotas on cotton manufactures; and tariff rates have been increased on woolen fabric imports in excess of a specified base.

Textile activity during the first eight months of '57 has run about 3% behind that of '56 and some 4% behind business in '55—"poor years even by recent standards," Shaw told his audience. But he predicted that this year would wind up on a stronger note, chiefly because of the "strained capacity" business that has been racked up by synthetic fibers. And '58, as a whole, will pack up "between 2-5%."

Others Better: Other industries discussed by members of the sales outlook panels included steel, by Tom Campbell, *Iron Age* editor-in-chief, and Norman Foy, vice-president of Republic Steel; petroleum, by B. L. Ray, Esso Standard Oil vice-president, and Malcolm Murdock, Ethyl's vice-president of sales; food, by Robert Perlitz, Consolidated Foods' vice-president, and Seth Shaw, vice-president of Safeway Stores.

The future of the construction industry was analyzed by George Smith, F. W. Dodge Corp. vice-president and economist, and Link Belt's David Davidson limned the machinery and equipment business.

For most industries the outlook is definitely better; growth in sales and production—barring a stimulation by war or a depressant effect by prolonged labor disputes—will be steady.



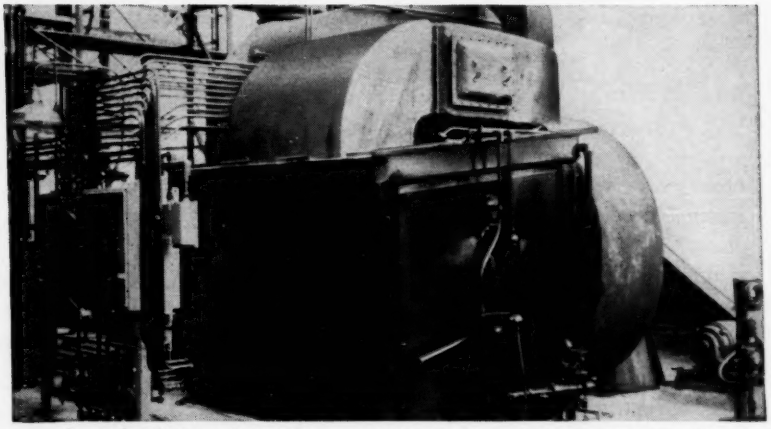
An important message to the man who thinks his air pollution problem is too difficult—or too expensive—to correct

Too often an air pollution problem exists today for one reason only: The company concerned does not yet know there is now at hand an efficient, effective method of correcting it—often at an actual saving through waste heat recovery.

The method is catalytic oxidation, and the firm that makes this development possible is Oxy-Catalyst, Inc.

Catalytic oxidation works by "burning" harmful and irritating combustible contaminants in an exhaust stream at temperatures far below their normal ignition points. It provides close to 100% cleanup of foul-smelling fumes and odors. It reduces fire hazards and maintenance problems by eliminating troublesome condensates in oven and furnace exhausts.

Thus Oxy-Catalyst installations can not only control air pollution. They can also be used to release the latent heat energy in waste and process gases. And they can sometimes do both at once.



Oxycat installation on Standard Oil Company of California's phthalic anhydride unit at Richmond, Calif.

A More Efficient Catalyst

The key to successful catalytic oxidation is, of course, the catalyst itself. Features which make the Oxycat unique are:

- *The combination of platinum and alumina, chosen from hundreds of elements and compounds as the most active and long lasting catalytic agent*
- *The carrier, a high-grade porcelain selected for its strength, chemical inertness, and resistance to high temperatures*
- *The patented method of applying the catalyst to the carrier*
- *The patented mechanical design of the Oxycat itself*

The result of this combination of features is a catalytic unit with exceptionally long life at high efficiency. Oxycats are strongly resistant to thermal shock—to contaminating agents and clogging. There's no problem of frequent cleaning or reprocessing. Oxy-Catalyst installations are still functioning at high initial efficiency after over 20,000 hours without maintenance or servicing.

Already in Wide Use

Oxy-Catalyst installations are now working effectively in a wide range of industries—oxidizing combustibles from such processes as asphalt oxidation; phthalic anhydride, polyethylene and ethylene oxide manufacturing; catalytic cracking; and many others.

Oxy-Catalyst installations are carefully engineered to your individual requirements, and our engineers, working with yours, can install Oxycats effectively in any existing plant. So, if air pollution is a problem in your operation—if irritating fumes and odors are costing you neighborhood good will—you should know that Oxy-Catalyst offers a practical, realistic answer to your problem.

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In many instances, bromine can supplant elemental chlorine and fluorine with marked improvement in processing yields, ease of handling, and developing new products. Specifically, you'll find . . .

Bromine compounds increase processing yields in:

Quaternary salt formations, nitrile formations; hydrolysis to carbinols; Grignard reactions in the aromatic series; Ullmann reactions, and Reformatsky reactions.

Bromine offers such processing advantages as:

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- Lower oxidation potential than those of chlorine or fluorine.
- Melting points of bromides are higher than those of chlorides or fluorides.
- Exceptionally high densities of bromine compounds.
- Catalytic properties of various inorganic bromides in reactions involving intramolecular rearrangements.

New product opportunities:

- Bromine imparts greater fire resistance to organic compounds than low molecular weight halogens.
- New pharmaceuticals are possible with bromine compounds as intermediates.
- Bromine can be compounded to produce active germicides, bactericides, and algicides.

You may discover many other significant and profitable bromine uses now that it is available in quantity. Michigan Chemical will be glad to help you with your present bromine needs, or with your basic bromine research. Just write or phone us.

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Market Newsletter

CHEMICAL WEEK
October 5, 1957

Last week's $2/kilo slash in domestic ascorbic acid schedules has one significant implication—the battle between U.S. producers and importers of foreign material is hot again. Other vitamin prices—thiamine hydrochloride and riboflavin, for example (*CW Market Newsletter, May 11*)—have been pressured by low-priced imports, but this is the first change in vitamin C price since a $4/kilo reduction in Feb. '56.

The new domestic prices, which are now at an all-time low, peg the acid at $10-11/kilo, depending on quantities. Other closely related items, including isoascorbic acid and sodium ascorbic acid, will also be affected by the changes.

It's still a question whether foreign ascorbic sellers will copy the latest domestic cuts, but odds are that they will.

•

Ethyl alcohol customers will continue to pay an unchanged price for their requirements, at least through the fourth quarter. Although most users wouldn't have been surprised if producers had kicked the price up a little, the latter passed up the deadline date for notifying contract customers about any impending change.

Actually, just about all sellers were poised to mark up ethanol schedules—labor, manufacturing, container costs for all have climbed consistently—but each waited for another to make the break.

Users are now pondering whether a rise will be posted before the next quarterly notification deadline date (Dec. 15).

•

U. S. primary aluminum production continues to inch up despite the current easing in demand. Latest Aluminum Assn. data indicates that August output was 143,448 tons vs. the previous month's 142,157 tons. Total through the first eight months of '57 is 1,110,733 tons, compared with 1,104,326 tons for the first eight months of '56.

A new aluminum outlet—oil cans—may boost the metal's use substantially. Major aluminum producer Reynolds last week signed a contract with Esso Standard Oil that will have Esso taking, initially, some 35 million qt. cans a year, and later perhaps as many as 60 million.

This order is said to be the first large aluminum-can order in any industry, and is being touted as the aluminum industry's major breakthrough in its long battle to win a place in the can market. Some 40 billion cans (worth more than $1.5 billion) are sold each year.

Featured in the Reynolds-Esso deal is a can salvage plan that includes installation of a can-crushing device at gas stations, pick up and reprocessing of the used metal. This will help keep the aluminum container prices in line with tinplate prices.

The recent slash in crude sulfur prices may affect a raft of sulfur-containing chemicals—at least that's what consumers are hoping. Tags on a few such products have already been altered because of the sulfur cut. A carbon bisulfide increase (0.1¢/lb.), for example, which was slated for Oct. 1, has been rescinded.

Later, announced advances on refined and commercial ground sulfurs were adjusted downward. A 50¢/cwt. across-the-board hike on the former was cut back to 40¢, while 10¢/cwt. was shaved from ground processed material schedules.

•

An Asian flu epidemic will set antibiotic sales booming. That's the private conviction of most antibiotic experts—in both industry and government—at last week's antibiotic symposium (*see p. 61*). They're not talking for the record yet because the American Medical Assn. and the U. S. Public Health Service have issued statements strongly opposing antibiotic treatment in flu cases for fear that extensive and "premature" use will harm patients and render the drugs useless against secondary infections that often follow flu. But drug men expect most MDs to ignore such warnings, are forecasting early and "profuse" use of antibiotics. This was done when Asian flu hit the Philippines, and it's credited with saving lives of some flu victims, reducing the length and severity of illness, preventing "complications."

As reported earlier (*CW Market Newsletter, Aug. 24*), some drugmakers are building antibiotic inventories against an anticipated demand for use in combating possible secondary infections.

•

Refined anthracene is now being produced in volume in the U. S. Output will come from a new Barrett Division installation at Ironton, O., capable of turning out some 2 million lbs./year. It'll be the first time in 40 years that anthracene has been manufactured domestically on a "substantial commercial scale," says the company.

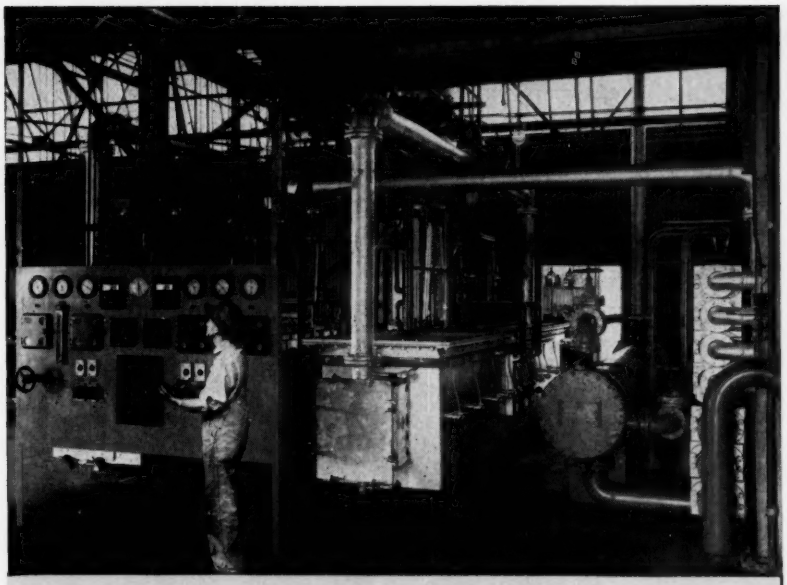
The new facilities produce a 90-95% pure crystalline product from creosote oils. The product is one result of the firm's continuing research program to increase the number of chemicals from coal tar.

SELECTED PRICE CHANGES — WEEK ENDING SEPTEMBER 30, 1957

	Change	New Price
DOWN		
Ascorbic acid, USP, dms., 25-100-kilo lots, kilo	$2.00	$10.00
Glycerine, crude, dom., nat., saponification, 88%, dlvd., tks.	0.01	0.165
Glycerine soap-lye, 80%, dlvd., tks.	0.01	0.15
Sodium ascorbate, dms., 25-50-kilo lots, kilo	2.00	10.00
Sulfur, commercial, flour, bgs., mines, cwt.	0.10	2.45
Sulfur refnd., flour, light, bgs., mines, cwt.	0.10	4.75

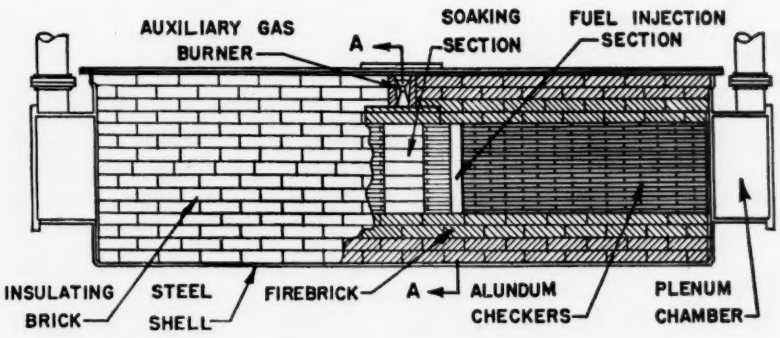
All prices per pound unless quantity is stated.

ALUNDUM* checkers give 4 years continuous service

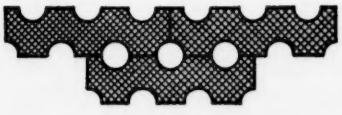


In this double regenerative furnace the Wulff Process Company of Huntington Park, Calif., produces acetylene starting with propane or other petroleum gas as the raw material. The Wulff Company reports that ALUNDUM checkers in this equipment are still going strong after continuous service, five days a week for more than four years.

Wulff Process Company says no replacement required in acetylene producing furnaces



Cross sectional diagram shows, in yellow, the location of Norton ALUNDUM checkers in the Wulff furnace. Air, preheated in the first ALUNDUM regenerator to 1800° F., is mixed with gas in the fuel injection section producing high temperatures and transferring this heat to the second regenerator. A propane-steam mixture is then passed in the opposite direction through the regenerators, heating and cracking in the second and cooling in the first. The heating and cracking cycles are both of one minute duration. ALUNDUM checkers take this extreme cyclic thermal stress and provide efficient, low cost operation.



Tubular passages for preheated flow are formed by ALUNDUM checkers. Their resistance to the erosion of hot gases is extremely important in many installations. Also, their purity is essential. Iron or other impurities could result in harmful side reactions in such gas cracking operations.

Norton refractories, engineered and prescribed for better performance in many types of equipment, provide long life, exceptional hot strength and maximum protection against the mechanical and chemical attacks of a wide variety of fuels. For further facts on these advantages write to NORTON COMPANY, Refractories Division, 569 New Bond Street, Worcester 6, Mass.

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

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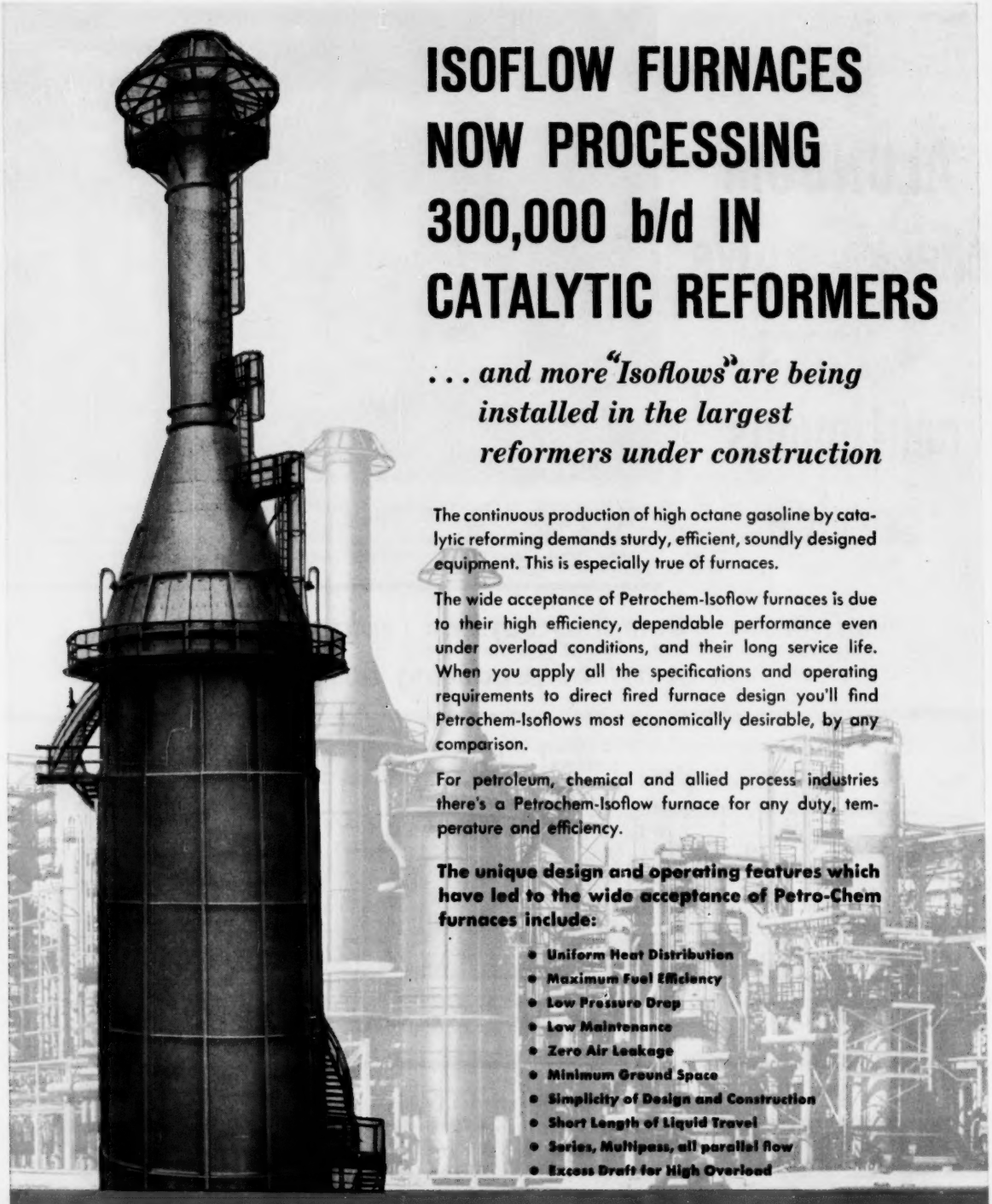

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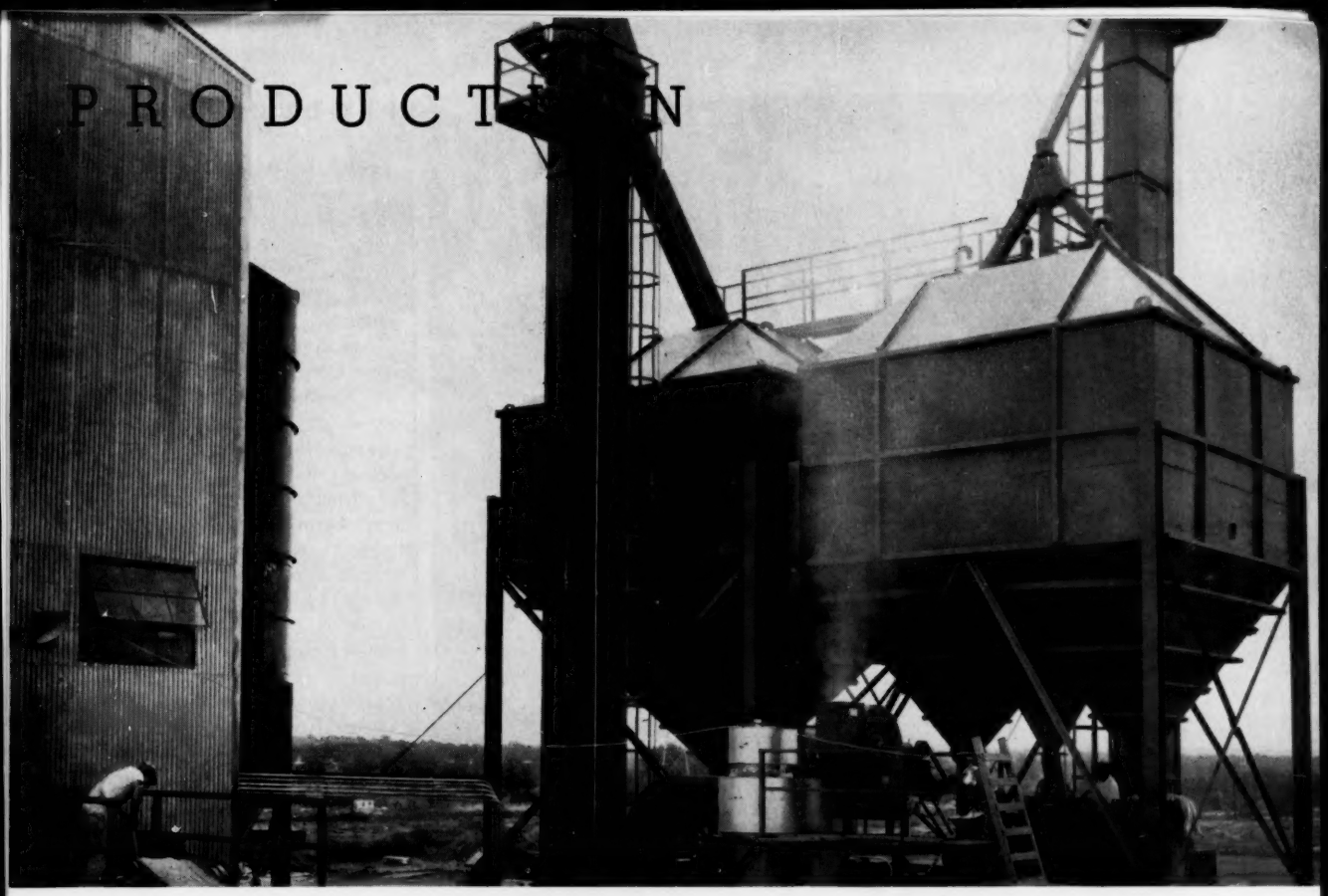


Sand, cement, lime and gypsum are mixed at new Denver plant of U.S. Durox Corp. of Colorado.

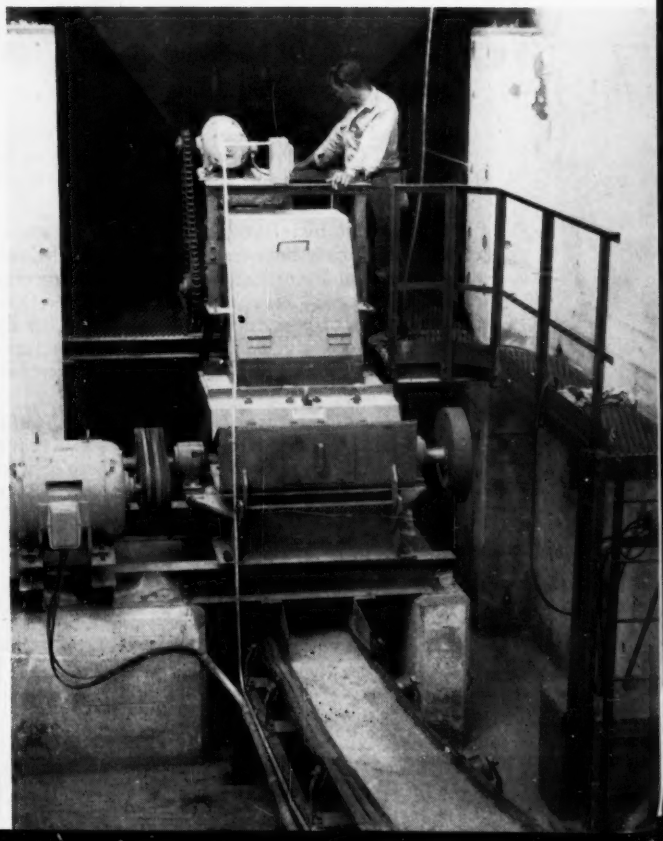
Swedish Gas Concrete Makes Its U.S. Debut

This week, as U.S. Durox Corp. of Colorado was ironing out the last startup "bugs" in its brand-new million-dollar Denver plant (above), it was already turning out 50 cu. yds./day of "gas concrete"—the first to be produced in this country (CW Technology Newsletter, Dec. 1, '56, p. 74) by the Swedish Durox process.

Production began Aug. 23, will reach plant capacity of 200 cu. yds./day by spring, according to the firm's president, Robert P. Anderson. And if the gas concrete, called Durox, lives up to the reputation it has made for itself as a building and insulating material over the past 30 years in Sweden, the springtime goal will be none too optimistic.

U.S. Durox is operating under a license from Swedish-American Industries, Inc. (Englewood, Colo.), a representative of Durox of Sweden. And licenses have been granted to others for plants in San Francisco, Miami and the Minneapolis-St. Paul and Dallas-Ft. Worth areas. American Ytong Syndicate markets a similar product in Canada, will build a plant in the state of Washington and hopes to build another in Vancouver, B. C.

Yet, once initial enthusiasm subsides, further gains may be more difficult. Reason: Durox's claims of low



Ball mills grind materials to 200 mesh.

density (25-45 lbs./cu.ft.) and relatively high compressive strength (400-1,400 lbs./cu.ft., respectively) will likely meet with skepticism. In the past, low density and high strength in foamed concrete haven't gone together.

Aerocrete (product of The Aerocrete Corp. of America, New York), which—like Durox—uses powdered aluminum for gas generation, is stronger than Durox; but it also is denser. It is used for heavier-duty construction than is Durox; it is not used for insulation.

Mearlcrete (Mearl Mfg. Corp., Roselle Park, N.J.) is a mechanically foamed product* of the same density range as Durox but of lower compressive strength (35-45 lbs./cu.ft. of material is rated at 250 lbs./sq.in. minimum).

Perlite (Great Lakes Carbon, New York)—which is expanded, then added as an aggregate to concrete—also has lower compressive strength.

Key difference between Durox and present U.S. competition is that Durox is foamed in molds at the plant. Most other products are foamed when they are poured on the job. Anderson says plant foaming gives a more uniform product.

Bubbles and Bread: First step in manufacture is the blending and grinding of sand, cement, lime and gypsum to minus 200 mesh size. Powdered metallic aluminum and water are added, mixed in at high speed.

The mixture is poured into greased molds, where leavening takes place. Tiny bubbles of hydrogen are generated, cause the concrete to rise like bread. Critical factors are aluminum particle size and temperature control—points at which most previous attempts to produce similar products ran into control difficulties.

Once the mixture has begun to set but is still plastic, it is cut into the desired shape with hydraulically operated wires. The cut material is then cured in an autoclave using high-pressure steam for 12 to 16 hours, depending on the density desired.

The result is a concrete with small voids surrounded by connecting films of calcium hydrosilicate.

Properties: Chief uses for the product are expected to be in roof decks, floor slabs, insulation and wall panel-

*Using Mearlcrete foam liquid, a stabilized protein hydrolysate based on fish scales and other materials, and foam equipment.

ESSO LAKTANE *RSVP*

Here's an unusual solvent in search of further uses. Wherever you need a high-solvency, fast-drying solvent with controlled evaporation, a "clean" odor, low residue, and reasonable price, we suggest that Esso Laktane may well be able to *cut your costs* and *improve the results*. A product of Esso Research, it is already the proven quality-leader in rotogravure printing and in the lacquer industry. But we think you'll be interested in its uses in producing neoprene rubber products and vinyl organosols, among many other potential uses. With uniform quality and *immediate availability* as well as *low cost*, you'll find that you are indeed *answering an invitation to higher profits*. Esso Standard Oil Company, Inc., 15 West 51st Street, New York 19, New York.

Esso

PETROLEUM SOLVENTS

PRODUCTION

ing, and building blocks. Heavy construction use is precluded by Durox's lack of great strength. But a certain amount of extra strength can be added by reinforcing slabs with a mild-steel grid during molding.

Durox has excellent insulating and fire-resistant properties. In tests by the Swedish government, one side of a 10-in. Durox wall was maintained at over 2000 F for eight hours. At no time during that period did the temperature on the opposite side of the wall go above 122 F. And the material is a good soundproofer.

Another attractive feature is that Durox can be sawed, nailed, bored and worked with ordinary woodworking tools.

Cost comparisons are difficult to make, will depend on the particular job at hand. But on a few jobs already undertaken with Durox slabs, Anderson reports, quotes ran as much as 30% below competition. With some other shapes, cost differentials are not as great.

Should Durox catch on, it will not lack for competition from new products. Several firms report they are experimenting with higher-compressive-strength products, are closely watching Durox's progress.

EQUIPMENT

Remote Liquid-Level Measurement: Texas Instruments Inc. (Dallas) is out with a new transistorized electronic system for measuring the liquid level in as many as 100 remotely located storage tanks. Called Data-Gage, the system includes receiver console, field selector unit and liquid-level gauge with power float. A receiver console initiates interrogation, decodes, checks and displays telemetered data, supplies intelligence for printer, teletype, computer or other instrument. Depths are measured from 0 to 64 ft.; accuracy of power floats is $\pm 1/16$ in.

•

Static Detector: A portable instrument for indicating the existence of static and pinpointing the area of disturbance, is the new offering of United States Radium Corp. (Morristown, N.J.). A chamber in the unit ionizes the air in the vicinity of the static disturbance. A sample charge is conducted to the instrument and measured. Dubbed the Statometer, it has a measuring range of 0-500,000 v.

How to make a Beeline

to a honey of a Plant Site

(a suggestion to men in chemicals)

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Nearness to markets
Excellent power at low rates
Productive manpower
Dependable N&W transportation
Adequate water
Nearness to the Port of Norfolk
Excellent climate
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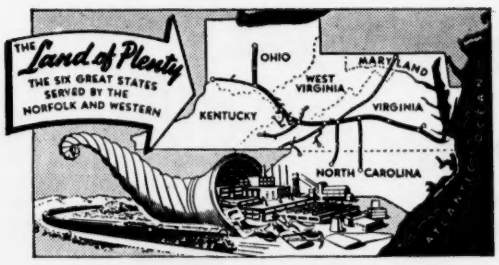

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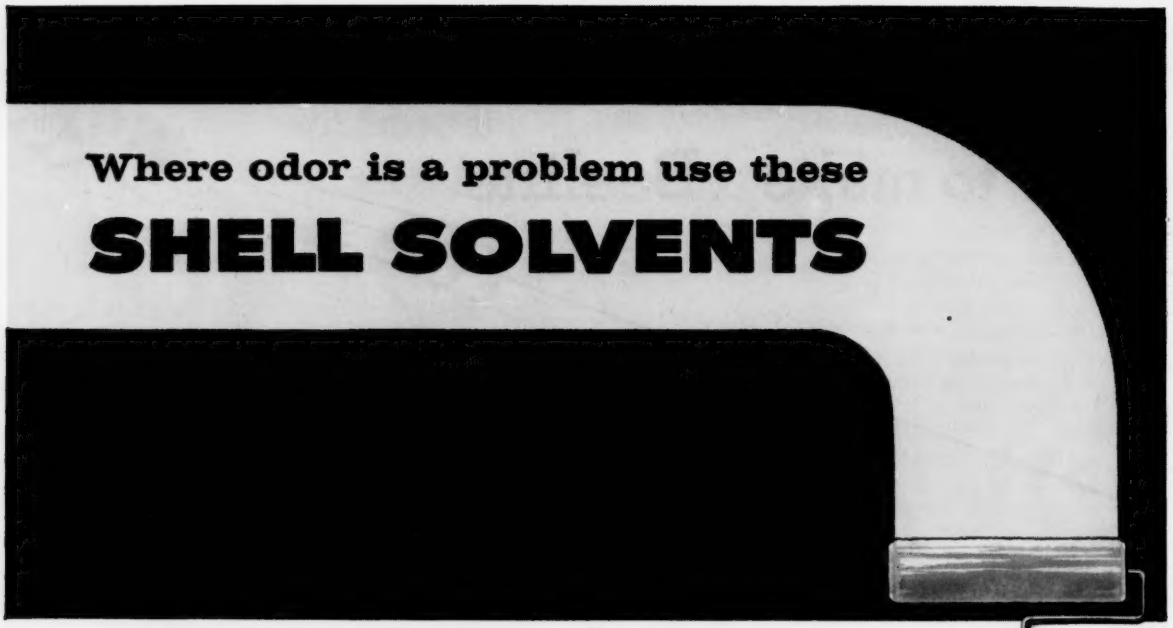

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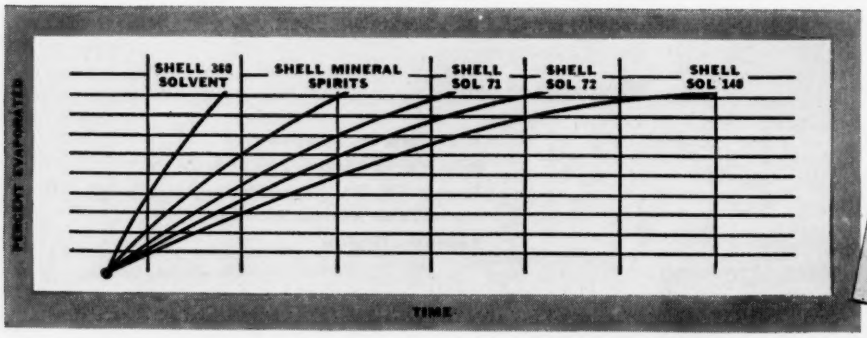

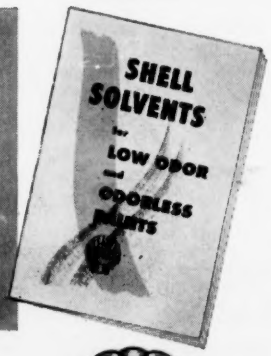

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SHELL

A Look at a Little-Known Specialties Market

At this month's meeting of the National Funeral Directors Assn. at Atlanta, Ga., a new line of embalming chemicals will be introduced by Dodge Chemical Co. (Boston). Called the Intro line, these products (Intro-flow, Intro-tone and Intro-fix) will join the rapidly expanding number of chemical specialties used in embalming.†

Because of squeamishness or a lack of awareness by market researchers, relatively little has been published on the subject of embalming chemicals and their market. Also, since manufacturers in this industry are not required by law to publish contents of their products on labels, there's been little the potential manufacturer could learn about what materials, other than general tissue preservatives, are contained in the various specialties used by morticians.

After interviewing embalmers, manufacturers, mortician schools, coroners and funeral directors, *CW* has assembled these facts about the embalming chemical business:

What They Use: The top-volume products used are embalming or preservative fluids. There are two main types—arterial fluid and cavity fluid. These have essentially the same composition (the first has 7.5-11.5% formaldehyde; the latter, about 18% —and referred to as 18 index*) except that dyes and other additives are not included in cavity fluids.

Arterial fluids, on the other hand, have these basic ingredients:

- Formaldehyde. Used almost universally as the basic embalming ingredient, its prime purpose is to coagulate the body proteins to prevent decomposition.
- Modifying agents. These may be required to treat specific cases. For example, cosmetics are added to treat a jaundiced appearance; sodium chloride or potassium nitrate, to slow down reaction time of the fluid with tissue.

Among other special additives:

- Blood solvents. These anticoagulants prevent blood clotting, aiding proper distribution of the fluid. This sometimes is incorporated in the fluid, but often is sold as a separate product, called a "preinjection" fluid. Among ingredients used for this purpose (and none of them are completely satisfactory) are oxalic acid, boric acid, borax, magnesium sulfate, potassium sulfate, potassium nitrate, potassium acetate, potassium chloride, sodium citrate, sodium nitrate, sodium oxalate, and sodium sulfate.
- Surface tension reducers. These create an easier flow of fluid through the walls of cells, include such chemicals as glycerine, glycols, sodium lauryl sulfate, sulfonated oils and triethanolamine.
- Dyes. Used for cosmetic effect to impart a more lifelike appearance, they include amaranth, carmine, cudbear, eosin, fuchsin and phenolphthalein.
- Aromatics or masking agents. Among these are menthol, methyl salicylate, oils of cinnamon, cloves, peppermint and wintergreen.
- Antiseptics. These materials help coagulate the protein, prevent bacteria from hastening decomposition and prevent later destruction by vermin. They include alcohol, *m*- and *p*-cresol, chlorothymol, furfural, hexylresorcinol, methyl hydroxybenzoate, phenol, salicylic acid, sodium benzoate, thymol sodium perborate, and zinc sulfate.

Vehicles: Water and alcohol are usually the vehicles used to carry these chemicals. Most of the various agents come ready-mixed with the embalming fluid; the only materials added by the embalmer are the dyes and the masking compound. Occasionally a fluorescent dye is added to embalming fluid to enable the embalmer to check, under ultraviolet light, the dispersion of the fluid throughout the body.

Shift to Dialdehydes: Perhaps the trend most important to embalming specialties suppliers is the movement away from formaldehyde to some of the dialdehydes. The dialdehydes are claimed to prevent the rapid dehydration of tissue that occurs when formaldehyde is used. They also have a less irritating odor. One of the companies pushing the dialdehydes is Champion Chemical Co. (Springfield, O.).

Use of dialdehyde isn't exactly new. Several (pyruvaldehyde and glyoxal) have been used in the past. Gluteraldyhyde has had good acceptance and a new product, 2-hydroxyadipaldehyde, is now being tested for use in embalming. Most dialdehyde formulations also contain about 10% formaldehyde.

Antibiotics have been tested, too, but without any great success. Pfizer

†About 1.5 million embalmings were performed in the U. S. last year.

*Embalming fluids are gauged and designated by an "index," which generally means the percentage of formaldehyde gas dissolved in the embalming fluid. Some manufacturers apparently misinterpret this index to their own advantage by considering it a percentage of formalin content. Since formalin is a 40% aqueous solution of formaldehyde gas, a fluid based on formalin content will have only a 10.8% gas content, though the manufacturer bills it as "27 index" fluid.

One Big Consumer's Purchases

Forest Lawn, one of the largest and best known cemeteries in the country, last year handled 3,000 mortuary cases. Here are a few of the chemicals that were used:

- **1,500 gal. of embalming fluid, including both cavity and arterial.**
- **60 gal. of alcohol for cleansing and dilution.**
- **6 gal. of sealer to cover incisions.**
- **144 pts. of dry wash for the hair.**
- **12,000 lbs. of hardening compound.**

has a patent (U.S. 2,805,975) on the use of a solution of oxytetracycline and streptomycin in embalming, but the company isn't actively pushing the idea. Factors limiting antibiotic success include the high cost of the antibiotics, difficulties in maintaining proper flesh colors, and the fact that an antibiotic-treated body doesn't meet other embalming standards.

Interference: The use of modern drugs has had relatively little effect on the traditionally used embalming materials. Penicillin and the sulfas, when used in large doses, present some problems, though negligible, in distribution of fluids and in flesh discoloration. Tranquilizers and some of the newer steroids have been accused of interfering with firming of the body, but on this point there's disagreement among embalmers. Medicines containing glucose can cause formation of a gelatinlike substance

LIONEL CRAWFORD

Liquid Gold Flowing in the Street

This middle-of-the-roader is busy applying a gold line 5 in. wide, 2.7 miles long on New York's Fifth Avenue, to commemorate the 50th anniversary of the Fifth Avenue Assn. Sprayed from an air compressor, the paint (which contains glass bead to reflect lights at night) dries in 35 minutes. The gold stripe extends from Washington Square (in downtown Manhattan) northward to 60th St. Application (50 gal. were used) took two hours, was done at 6 a.m. under supervision of the city's Traffic Dept.

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Your Pfizer representative will be glad to explain how Citroflex plasticizers can serve your needs.

Costs of these citric acid esters are remarkably low, compared to other nontoxic plasticizers. Besides A-2 and A-4, the Pfizer Citroflex line includes Citroflex 2 (Triethyl Citrate), Citroflex 4 (Tributyl Citrate) and Citroflex A-8 (Acetyl Tri-2-Ethylhexyl Citrate). Check into the Pfizer Citroflex plasticizers today.

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in a body that has been refrigerated. But this is overcome by raising the temperature of the embalming fluid and the body.

For jaundice cases, special fluids are used, some of them phenol-based, to prevent discoloration caused by action of the formaldehyde with bilirubin pigment. For obese cases, fluids containing a surface-active agent (usually sodium alkyl lauryl sulfate) must be used.

Other chemical products used by morticians are various disinfectants, soaps, sealers for lips and eyelids, plastic wax to build damaged areas, cosmetics, shampoos, hardening compounds (wood flour, and other material for drying and filling bodies that have undergone autopsy), mould preventives (Vaseline or oil-based cosmetics for short term, *p*-dichlorobenzene for longer periods) and solvents to clean embalming instruments.

How Big: Industry estimates of the market for embalming materials range from $4-10 million/year; the average guess is $5 million. Of this, about 75% goes for the preservative chemicals, the rest for cosmetics. A body, if good materials are used, will usually contain $3-5 worth of embalming chemicals. Virtually all bodies are embalmed. Still-born babies, some members of the Jewish faith, some accident cases and some inhabitants of backwoods areas are not. Virtually all the 350,000 bodies that are cremated in the U.S. each year are embalmed before incineration —for preservation during funeral services.

Top Twelve: About 90% of the embalming chemicals business goes to twelve firms. National firms, in probable order of dollar volume/year, are Champion Chemical Co., Dodge Chemical Co., Undertakers Supply Co. (Chicago), Embalmers Supply Co. (Westport, Conn.), L. H. Kellogg Chemical Co. (Minneapolis—a mail-order house), Royal Bond Inc. (St. Louis), Hydrol Chemical and H. S. Eckels (both of Philadelphia).

Among the big regional producers are Fluids Chemical Co. (Chicago), Morticians Supply Co. (Dallas), Eureka Fluid Works (San Francisco), and Gold Crest Chemical (Wilmington, Del.).

Most of these companies (with the exception of Kellogg) sell their products direct. There are a few jobbers

CHEMICAL WEEK • ADVERTISERS INDEX

October 5, 1957

tracers SECTION

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Selling Opportunity Wanted

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Clean Hectograph: Developing new process. Patent pending, need company with capital and coating machines. BO-5860, Chemical Week.

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Wanted to purchase 55 gallon stainless drums in good condition—used. W-6255, Chemical Week.

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in the field. Some of the casketmakers stock material for the convenience of their customers, but this comprises a very small portion of the business. One casketmaker, National Casket, manufactured embalming chemicals until several years ago.

Buying Directors: Sales are usually made to funeral directors, who are often the ones who do the embalming. A full-time embalmer (average wage is $110/week) has some influence in choice of supplies. In the industry, a number of embalmers are independent contractors, embalm on a flat-fee basis (usually about $25-30/body), usually use chemicals provided by funeral directors.**

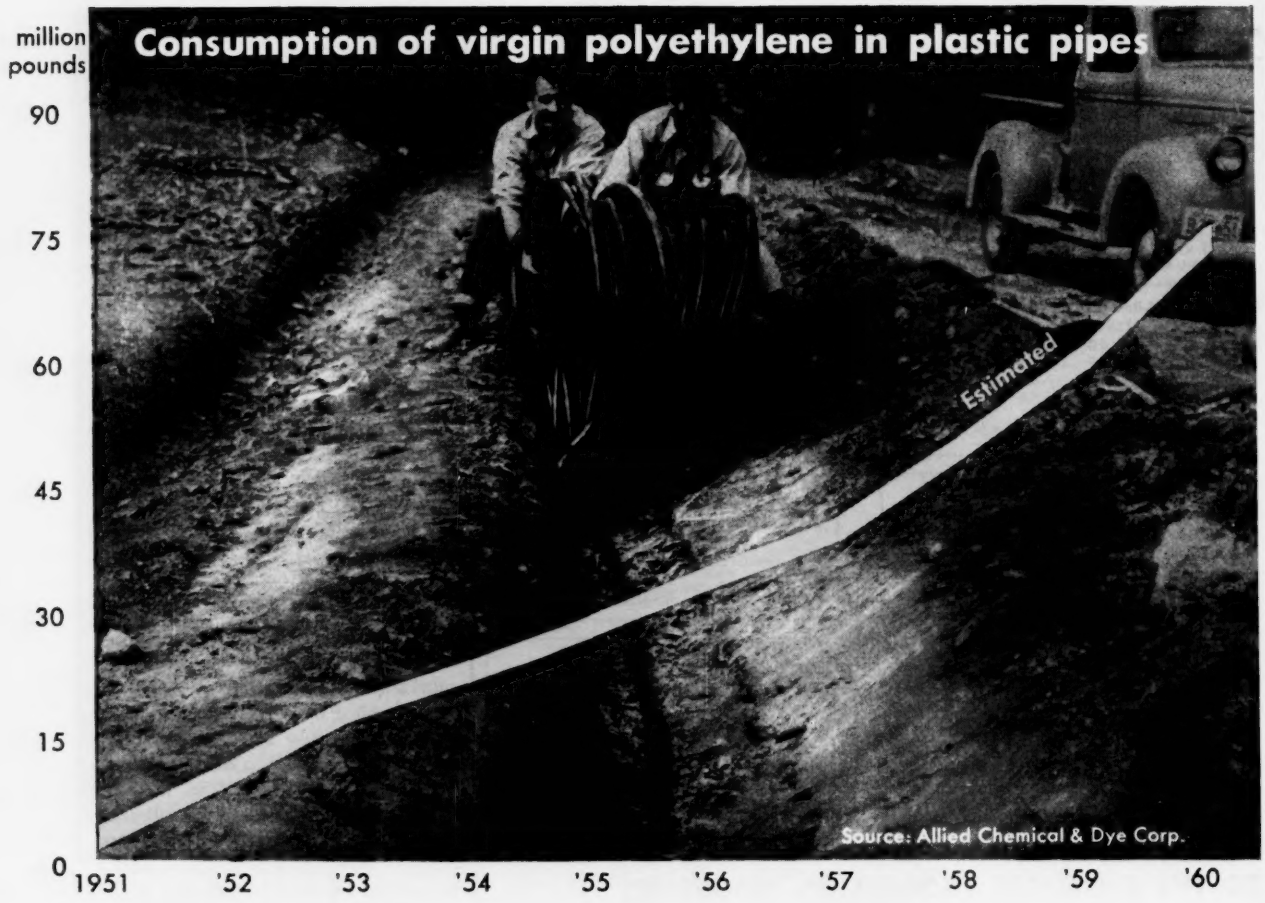
Embalming fluid is usually sold to the nation's 25,000 funeral directors in pint bottles (24-bottle cases), priced from $13 to $40/case. Fluid is also sold in 5-gal. and 48-gal. containers. About 1 pt. of cavity fluid and 1½-4 pts. of arterial fluid are used per body.

One of the current problems in selling embalming chemicals (not a new one) is the practice of premium selling. One company is currently giving $75 worth of golf clubs, fishing tackle, etc., to purchasers of 10 cases of embalming fluid, much to the consternation of other makers. Competition is fierce, chiefly because the death rate in the country is fairly steady. This inelastic demand for their products means that the makers must get new business from competitors.

Credit terms in the industry are remarkably lenient, call for 2%, 30 days and net 60. Part of the reason for this largess is because a funeral director, too, must often wait to collect.

Smarter Customers: The nation's 20 mortuary schools (total enrollment about 1,400) are turning out students with a substantial technical background—a far cry from the day when an embalmer got a three-day hurry-up course in his practice. The turnout of better-trained embalmers (some states now require two years of college, one year of embalming school) means that the makers of embalming chemicals will have to satisfy more knowledgable buyers, who won't be content to buy on the basis of price alone.

**In selling embalming chemicals, a salesman sometimes deals with a strange combination of business—an electrical dealer-mortician. This evolved from the movement of the town cabinetmaker (and coffinmaker) to furniture dealer (and mortician) to furniture dealer with appliances (still remaining a mortician) to appliance dealer without the furniture (but still retaining the funeral business).



Plastic Pipe: Polyethylene Pace-Setter

More than 75 million lbs. of polyethylene resin will be used in making lightweight plastic pipe in 1960. That's the prediction that James Sayre and Stanley Mruk, of Allied Chemical & Dye, made at the American Chemical Society's New York meeting.

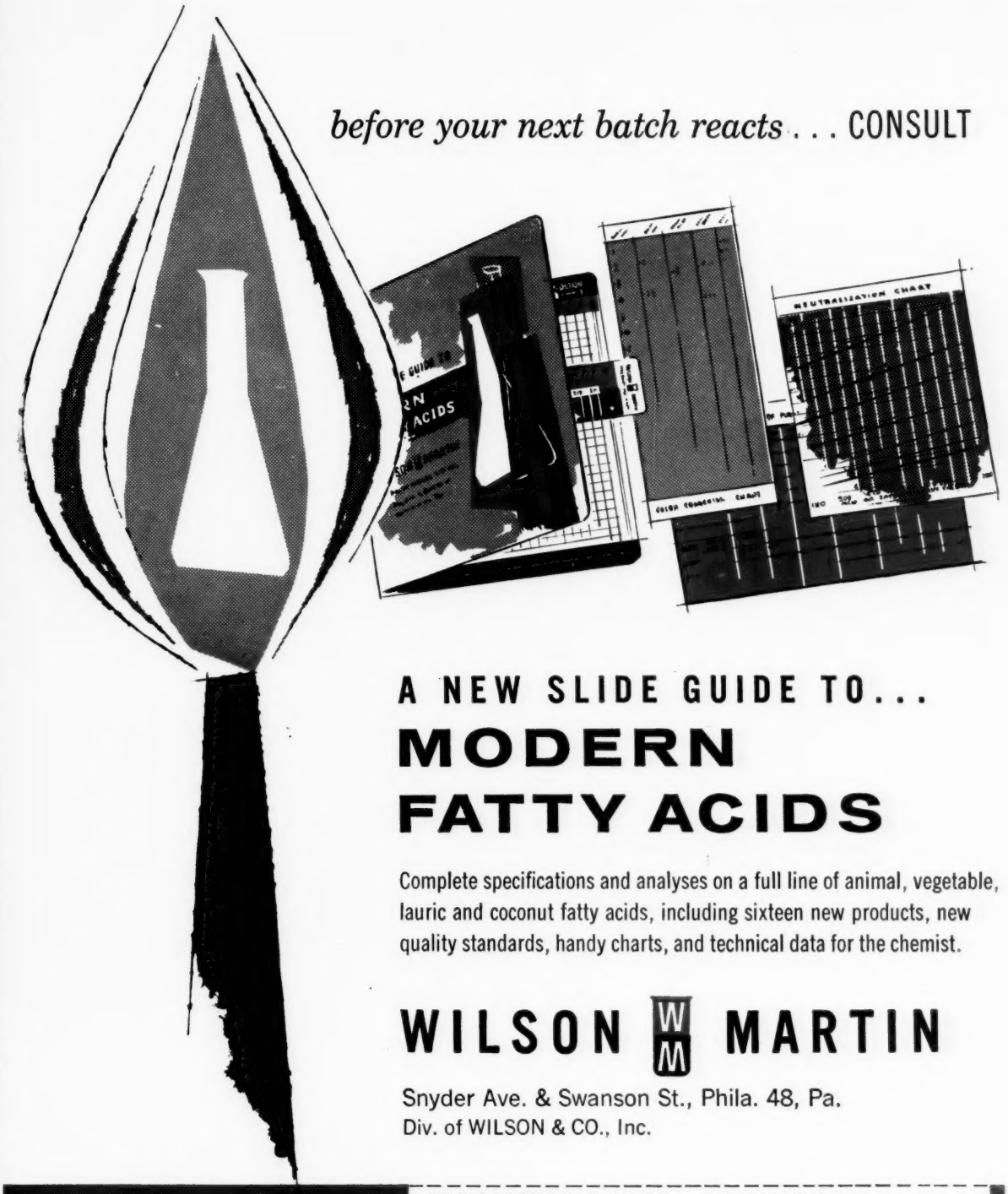
But the prediction was qualified—e.g., "if quality standards are enforced, if better resins are available, if the construction industry realizes its revival."

About 6-7% of the virgin resin produced goes into pipe manufacture, but this use has grown about 10-fold in the last half-decade.

This year, according to Sayre and Mruk, approximately 55 million lbs. of resin—including an estimated 15 million lbs. of scrap—will be so used.

Biggest pipe use of resin (virgin and scrap) this year will be in farm water lines—8 to 10 million lbs.

before your next batch reacts . . . CONSULT



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